Department of Energy

FY 2011 Report to Congress

Laboratory Directed Research and Development (LDRD)
at the DOE National Laboratories

For additional information on the Department's Laboratory Directed Research and Development program, please see the Office of Science website:
http://science.energy.gov/lpe/laboratory-directed-research-and-development/
or the National Nuclear Security Administration website:
http://tri-lab.lanl.gov/

Formally, this Report responds to the Conference Report (H.R. Rep. No. 106-988 (Conf. Rep.)) accompanying the Fiscal Year (FY) 2001 Energy and Water Development Appropriations Act, which requested the DOE Chief Financial Officer "develop and execute a financial accounting report of LDRD expenditures by laboratory and weapons production plant." It also responds to the National Defense Authorization Act for Fiscal Year 1997 (Pub. L. No. 104-201), which requires submission each year of "a report on the funds expended during the preceding fiscal year on [LDRD] activities […] to permit an assessment of the extent to which such activities support the national security mission of the Department of Energy." Further, this Report addresses the requirement in the Conference Report (H.R. Rep. No. 107-258 (Conf. Rep.)) accompanying the FY 2002 Energy and Water Development Appropriations Act, which requests the Secretary of Energy include in the annual Report to Congress on LDRD expenditures "an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that support science and technology development that benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies."

For the purposes of this document, Laboratory Directed Research and Development refers to "research and development work of a creative and innovative nature which [...] is selected by the director of a laboratory for the purpose of maintaining the vitality of the laboratory in defense-related scientific disciplines" [National Defense Authorization Act for Fiscal Year (FY) 1991, Pub. L. No. 101-510].

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Secretarial Affirmation

On behalf of the Department of Energy, I am pleased to present the Fiscal Year 2011 Laboratory Directed Research and Development (LDRD) Report to Congress. The Department's national laboratories execute long-term national missions and develop unique scientific and technical capabilities beyond the scope of academic and industrial institutions. Further, the laboratories develop and sustain scientific and technical capabilities that the Federal Government deems critical and desires assured access. The LDRD Program provides the laboratories with the opportunity and flexibility to establish and maintain an environment that encourages and supports creativity and innovation, and contributes to their long-term viability. LDRD is indispensable to the Department because it enables the laboratories to position themselves to advance our national security mission and respond to our Nation's future research needs.

Based on the information and acknowledgments provided to the Department and its contractors by other Federal agencies that are funding LDRD activities in fiscal year 2011, I affirm that all LDRD activities derived from funds of other Federal agencies (1) have been conducted in a manner supporting scientific and technical development that benefits the programs of the sponsoring agencies, and (2) is consistent with the appropriations acts that provided funds to those agencies.

Steven Chu

Secretary of Energy
February 28, 2012

Introduction

The Atomic Energy Act (AEA) of 1954, Pub. L. No. 83-303, section 31, as amended, 42 U.S.C. §§ 2011 et seq., directs the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) to ensure the continued conduct of research and development (R&D) and to assist in the acquisition of an ever-expanding body of theoretical and practical knowledge in the fields of energy, its production, uses, handling, and effects. This mission, initially the responsibility of the Atomic Energy Commission (AEC), then that of the Energy Research and Development Administration (ERDA), and subsequently of DOE, has been and continues to be carried out to a significant extent in government-owned facilities.

The AEC recognized that to maintain the laboratories' intellectual vitality, their ability to respond immediately to developments at the cutting edge of science and technology**,** and their ability to retain the best scientific, technological, and managerial talent, a certain amount of work must be left to the laboratories' discretion. Thus, from its inception, the AEC and its successor agencies made allowable certain amounts of research derived from the ideas of the national laboratory researchers themselves.

In 1985 and in response to the recommendations of prestigious national panels and commissions, the Department established the Exploratory Research and Development Program (ER&D) to formalize the practice of providing its national laboratories with the means to conduct laboratory initiated R&D.[1] Six years later, DOE renamed the program Laboratory Directed Research and Development (LDRD) and formally established it at the DOE national laboratories. Today, the LDRD Program at the DOE national laboratories and analogous programs at the Department's nuclear weapons production plants (Plant Directed Research and Development, or PDRD) and Nevada National Security Site (NNSS; Site Directed Research and Development, or SDRD) are active components of DOE mission to promote scientific and technical (S&T) innovation that advances the economic, energy, and national security of the United States (U.S.).[2]

All LDRD activities conducted at the DOE national laboratories are governed by a standard DOE policy (DOE Order 413.2B, *Laboratory Directed Research and Development*), that provides guidance to ensure effective management and oversight of the LDRD Program, while at the same time supporting the laboratories' statutory authority to pursue innovative, self-selected projects in support of the DOE mission. DOE's LDRD policy is consistent with the Department's management practices for all R&D activities in that it includes annual planning and reporting requirements, as well as program and peer reviews to ensure the investments reflect highly innovative, high quality research projects. In addition, DOE concurs with each proposed LDRD project before a laboratory commences work on it to ensure the project complies with Departmental policy. The remainder of this Report formally responds to the LDRD Program financial reporting requirements required by law - (see, Appendix 1 for the list).

[1] See, among others, the *Report of the White House Science Council*, Office of Science and Technology Policy, Executive Office of the President, Washington, DC, May 1983; and Guidelines, Energy Research Advisory Board, December 1985.
[2] PDRD Programs at DOE's Kansas City, Y-12, Pantex, and Savannah River Plants are consistent with the statutory authorizations found in Section 310 of the FY 2001 Energy and Water Development Appropriations Act (Pub.L. No. 106-377) and Section 3156 of the FY 2001 Floyd D. Spence National Defense Authorization Act (Pub. L. No. 106-398). The NNSS's SDRD Program is consistent with the statutory authorizations found in Section 310 of the Energy and Water Development Appropriations Act, FY 2002, (Pub. L. No. 107-66).

FY 2011 LDRD Financial Reporting

In accordance with Section 308 of Division C of the Omnibus Appropriations Act, FY 2009, (Pub. L. No. 111-8), the maximum funding level established for LDRD must not exceed eight percent of a laboratory's total operating and capital equipment budget, including non-DOE funded work, for the year. LDRD is a cost of doing business that is accumulated through a percentage of the overhead rate charged by a laboratory; this is based on the premise that LDRD is a cost for keeping the laboratories vibrant, cutting edge and creative in ideas and new fields, and thereby benefits all programs doing work at a laboratory. LDRD is considered an allowable cost in accordance with the terms of the laboratory management and operating contracts and is identified in the laboratories' accounting systems. Table 1 includes the FY 2011 end-of-year information.

Table 1. FY 2011 Overall Laboratory Costs and LDRD Costs at DOE Laboratories

Laboratory	# of LDRD Projects	LDRD Certified Costs ($M)	Total LDRD Certified Cost Base ($M)[3]	LDRD as a % of Certified Cost Base
Argonne National Lab	123	29.6	708.9	4.18%
Brookhaven National Lab	50	12.2	490.4	2.49%
Idaho National Lab	115	30.8	967.7	3.18%
Lawrence Berkeley National Lab	96	20.4	715.2	2.85%
Lawrence Livermore National Lab	142	96.6	1,595.9	6.05%
Los Alamos National Lab	292	138.3	2,205.5	6.27%
National Renewable Energy Lab	44	8.7	343.6	2.53%
Oak Ridge National Lab	174	32.1	1,388.0	2.31%
Pacific Northwest National Lab	168	40.3	918.3	4.39%
Princeton Plasma Physics Lab	15	2.4	86.9	2.76%
Sandia National Labs	427	160.6	2,451.7	6.55%
Savannah River National Lab	31	5.6	152.8	3.66%
SLAC National Accelerator Lab	15	3.6	281.9	1.28%
Total	**1,692**	**581.2**	**12,306.8**	**4.72%**

The total FY 2011 LDRD Program cost at the national laboratories was $581 million, which represents approximately 4.7 percent of total cost base at these laboratories. In analyzing the LDRD spending trends since FY 2007 across all the national laboratories, there has been modest growth to the LDRD cost base, while the

[3] Certified Cost Base is defined in DOE Order 413.2B and represents a laboratory's total operating and capital equipment budgets, including non-DOE funded work, but excluding Recovery Act costs for the year.

LDRD spending has remained relatively flat when adjusted for inflation. The overall LDRD percentage is well below the maximum eight percent during this period.

An analysis of the total FY 2011 LDRD program cost of $581 million was conducted as it relates to funding received from defense and non-defense sources (including DOE and Work for Others sponsors) and the DHS, as well as of the applications and contributions to national defense, non-defense, and DHS missions that are expected to accrue from each LDRD project. As a result of this review, DOE has determined that, of the total $581 million spent on LDRD at the national laboratories in FY 2011, approximately $370 million was provided by defense customers, approximately $193 million was provided by non-defense customers, and approximately $18 million was provided by the DHS. Furthermore, under the FY 2011 LDRD program, $407 million supported projects that are expected to benefit the defense and national security mission areas, $489 million supported projects that are expected to benefit nondefense customer mission areas, and $192 million supported projects that are expected to benefit DHS programs. As the numbers indicate, this assessment and expectation is based on the premise that many of the FY 2011 LDRD projects will ultimately benefit and apply to more than one national mission area.

LDRD and the Work for Others Program

The Work for Others (WFO) program creates opportunities to leverage non-DOE Federal and non-Federal resources to accelerate scientific discovery and deploy solutions to the dual benefit of DOE and the sponsoring entity. WFO plays an important role in the laboratories' efforts to develop, strengthen, and sustain unique S&T capabilities deemed critical by the Government and, in many cases, represents a coordinated set of activities that seek to address large and complex national needs. This leveraging of DOE and WFO activities enables the laboratories to deliver national solutions in a cost-effective manner.

Congress provided language in the Conference Report accompanying the Energy and Water Development Appropriations Act, FY 2002, that requested the Department notify other Federal agencies that a portion of WFO programs will be used to fund LDRD projects. In addition, with the creation of the Department of Homeland Security in the FY 2002 Homeland Security Act, Congress enacted analogous requirements that LDRD funding associated with DHS programs be used to benefit DHS missions. In response to the FY 2002 Conference Report, the Secretary issued guidance requiring all LDRD laboratories to notify other Federal agencies of LDRD charges prior to funding work at the laboratories. Specifically, each new and/or revised WFO proposal DOE provides to a Federal agency must indicate the amount of LDRD charges that will be collected on the project. Furthermore, the proposal notifies the sponsor that, by providing funding, the agency is acknowledging that LDRD activities are beneficial to its organization and consistent with the Appropriation Acts that provide funding to it. Subsequently, each WFO funding acceptance document also includes the LDRD charge estimate acknowledgement.

In February of 2003, the Secretary of Energy and the Secretary of Homeland Security entered into a Memorandum of Agreement to implement key provisions of the Homeland Security Act. In addition, the Deputy Secretary of Energy issued DOE Order 484.1 on *Reimbursable Work for the Department of Homeland Security.* The purpose of this latter document was to provide information on the process by which the DHS may place orders for reimbursable work activities to be performed at the DOE laboratories. Within that Order, there are provisions for notification of LDRD charges in the cost proposal as well as requirements for acknowledgements regarding the benefits of LDRD prior to final approval.

In December of 2003, DOE's Acting Chief Financial Officer provided other Federal agency Chief Financial Officers who are customers and sponsors of work at the Department's laboratories with applicable guidance and policy documents to explain the Department's processes. Collectively, the implementation and execution of these policies provides the basis for the Secretary's affirmation that the LDRD Program is managed in accordance with the Congressional requirements cited above.

FY 2011 PDRD and SDRD Programs – Financial Reporting

Plant Directed Research and Development (PDRD)- Fiscal Year Expenditures

Section 308 of Division C of the Omnibus Appropriations Act, 2009 (Pub. L. No. 111-8) enabled the Secretary of Energy to authorize an amount not to exceed four percent for PDRD. Table 2 shows FY 2011 PDRD expenditures by site.

A review conducted by the Department identified that Y-12 and Pantex in FY 2011 and prior years did not apply Common Site Support Overhead to its PDRD projects as recommended by House of Representatives Conference Report,- H.R. Rep. No. 109-275 (2006) (Conf. Rep.). The Department has elected to apply those overhead rates in the future. The FY 2011 LDRD report was adjusted to reflect the full PDRD costs.

Table 2. FY 2011 PDRD Expenditures

Plant	# of PDRD Projects	PDRD Certified Costs ($M)	Total Plant Certified Cost Base ($M)	PDRD as a % of Certified Cost Base
Kansas City	79	8.0	472.0	1.69%
Pantex	22	2.8	553.5	.51%
Savannah River	12	3.0	138.3	2.17%
Y-12	83	25.4	730.4	3.48%
Total	**196**	**39.2**	**1,894.2**	**2.07%**

Site Directed Research and Development (SDRD) – Fiscal Year Expenditures

Section 308 of Division C of the Omnibus Appropriations Act, FY 2009 (Pub. L. No. 111-8) enabled the Secretary of Energy to authorize an amount not to exceed four percent for SDRD. Table 3 shows FY 2011 SDRD program expenditures.

Table 3. FY 2011 SDRD Expenditures

Site	# of SDRD Projects	SDRD Certified Costs ($M)	Total Site Certified Cost Base ($M)	SDRD as a % of Certified Cost Base
Nevada National Security Site	46	5.7	396.5	1.44%

Scientific Productivity and Performance

LDRD is the principal mechanism through which the Department's national laboratories can support the formulation of new theories, hypotheses, and approaches; build new and enhance existing S&T capabilities; and identify and develop technology applications with the potential to advance the DOE mission. Over the years, LDRD Programs and projects have realized major science and technology breakthroughs that have been reported widely in the scientific community. In addition, they have provided the laboratories with the opportunity to acquire foundational tools—that include S&T capabilities, as well as people—necessary to ensure their long-term viability. The Laboratory Directed Research and Development page on the Office of Science website

(http://science.energy.gov/lpe/laboratory-directed-research-and-development/success-stories/) provides a number of examples of highlights associated with the LDRD program at the DOE and NNSA national laboratories. Additionally, summarized below are examples of key performance results of the LDRD Program for the last several fiscal years.

Workforce Development

A principal goal of the LDRD Program is to develop a world-class scientific, technical, and engineering workforce capable of responding to the future needs of the Nation. The LDRD Program, over time, has proven itself to be instrumental in the laboratories' ability to attract promising young scientists and engineers, thus providing the basis for continually refreshing the laboratory research staff, as well as for the education and training of the next generation of scientists. This includes support for both undergraduate and graduate students working on LDRD projects, technical staff retention associated with opportunities to retain and hone scientific skills via LDRD, and a range of university collaborations stimulated via LDRD projects. Furthermore, the LDRD Program plays an important role in attracting early-career post-doctoral researchers to the laboratories, as shown in Table 4 below. Based upon our experience, post-doctoral appointments offer the single largest source of new scientific and engineering talent for the DOE laboratories and are therefore essential to maintaining their institutional vitality.

Table 4. Post-Doctoral Researchers Supported by LDRD at the DOE Laboratories in FY 2011

	Total Postdoctoral Count		
	Total # Postdoctoral Researchers at the National Laboratories	**Total # of Postdoctoral Researchers Supported by LDRD Funding[4]**	**% of Postdoctoral Researchers Supported by LDRD Funding**
Total # in FY2011	3,339	944	28.3%

Publications

Publication in the open literature is an important component of any research and development (R&D) program, especially those that involve the more fundamental scientific studies. Because these reports must first pass through expert reviews by peers in the relevant fields, they are demonstrative of the scientific quality of the knowledge produced through R&D.[5] The table below provides aggregate numbers of publications derived from LDRD activities at the DOE laboratories for fiscal years 2008 through 2010. These statistics demonstrate that LDRD is producing a high volume of outstanding science in areas for which the government desires future access.

Table 5. Cumulative Number of Peer-Reviewed Publications Derived from LDRD Projects in Fiscal Years 2008, 2009, and 2010

	Total Publication Count		
Fiscal Year	**2008**	**2009**	**2010**
Total # Peer Reviewed Publications	2,029	1,940	1,976

Intellectual Property

In 1989, the National Competitiveness Technology Transfer Act (Pub. L. No. 99-502) established technology transfer as a mission of Federal R&D agencies, including the DOE. Since then, DOE has encouraged its national

[4] The number of postdoctoral researchers supported by LDRD in FY 2011 includes postdoctoral researchers at the DOE/NNSA laboratories that spent 10% or more of their time at a laboratory working on LDRD during the fiscal year.
[5] There is no standard value for publications across technical fields (e.g., chemists publish numerous short papers, mathematicians publish less frequently but more in-depth, and geologists publish accounts of field work).

laboratories to find ways to bring the knowledge, intellectual property, facilities, and capabilities they have developed to the market-place in order to meet public and private needs.

Over time, the Department has found that LDRD Programs and projects are a productive component in its ability to advance its technology transfer mission. One example of LDRD's productivity is the number of invention disclosures and patents—a useful indicator in measuring technological strength and innovation—that stem from LDRD projects. The table below illustrates the distribution of patents and invention disclosures for fiscal years 2008-2010.

Table 6. Cumulative Number of Patents Filed/Granted and Invention Disclosures Derived from LDRD Projects in Fiscal Years 2008, 2009, and 2010

	Total Intellectual Property Count		
Fiscal Year	**2008**	**2009**	**2010**
Total # Patents	117	116	150
Total # Invention Disclosures	372	378	416

Appendix 1. Statutory and Report language Related to LDRD

Section 308 of Division C of the Omnibus Appropriations Act, FY 2009 (Pub. L. No. 111-8).
LABORATORY DIRECTED RESEARCH AND DEVELOPMENT. Of the funds made available by the Department of Energy for activities at government-owned, contractor-operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory directed research and development: *Provided,* That the Secretary may also authorize a specific amount not to exceed 4 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site directed research and development: *Provided further,* That notwithstanding Department of Energy order 413.2A, dated January 8, 2001, beginning in fiscal year 2006 and thereafter, all DOE laboratories may be eligible for laboratory directed research and development funding.

Section 309 of Division C of the Consolidated Appropriations Act, FY 2008 (Pub. L. No. 110-161).
LABORATORY DIRECTED RESEARCH AND DEVELOPMENT. Of the funds made available by the Department of Energy for activities at government-owned, contractor-operator operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory-directed research and development: *Provided,* That the Secretary may also authorize a specific amount not to exceed 4 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site-directed research and development: *Provided further,* That notwithstanding Department of Energy order 413.2A, dated January 8, 2001, beginning in fiscal year 2006 and thereafter, all DOE laboratories may be eligible for laboratory directed research and development funding.

109th Congress - House of Representatives Conference Report (H.R. Rep. No. 109-275 (2006) (Conf. Rep.)).
"The conferees are concerned with the level of overhead charges applied to programs funded in this bill and urge the Department to continue to work to minimize the overhead burden on all program activities. In order to ensure an equitable allocation of overhead costs the Secretary should apply overhead charges to LDRD activities consistent with cost accounting practices applied to program activities that are direct funded. The conference agreement increases the allowable percentage for LDRD, PDRD and SDRD activities to allow this accounting change without harming the underlying discretionary research activities. The change in accounting practices should be implemented with no net reduction in LDRD levels below 6 percent of the funds provided by the Department of Energy to such labs for national security activities and 2 percent for PDRD and SDRD activities at the appropriate plants and sites. Within 90 days after the date of enactment of this Act, the Secretary of Energy shall submit a report to the Committees on Appropriations detailing how the accounting change will be implemented without impacting the basic research and the change shall be implemented within 180 days of enactment."

Section 311 of the Energy and Water Development Appropriations Act, FY 2006 (Pub. L. No. 109-103).
"Of the funds made available by the Department of Energy for activities at government-owned, contractor-operator operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory-directed research and development: *Provided,* That the Secretary may also authorize a specific amount not to exceed 3 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site-directed research and development: *Provided further,* That notwithstanding Department of Energy order 413.2A, dated January 8, 2001, beginning in fiscal year 2006 and thereafter, all DOE laboratories may be eligible for laboratory directed research and development funding."

108th Congress - House of Representatives Report (H.R. Rep. No. 108-212 (2004)). "The Committee recognizes the value of conducting discretionary research at DOE's national laboratories. Such research provides valuable benefits to the Department and to other Federal agencies, and is crucial to attracting and retaining scientific talent at the laboratories. However, the Committee continues to have concerns about the financial execution of this program. One concern centers on the manner in which DOE levies the LDRD ''tax'' on all DOE and Work for Other programs, and then accumulates the funds into an overhead pool. This Committee typically deals with defense and non-defense allocations within the Energy and Water Development bill, and the line between those two allocations is not easily crossed. Under LDRD, however, the laboratory directors are able to pool defense and non-defense appropriations at will. The only obvious solution to this concern is to require DOE to establish and track separate LDRD accounts for defense and non-defense funding sources, and the Committee is not yet ready to direct that change. The other principal concern deals with the application of LDRD to work being performed for other agencies (Work for Others). The conference report accompanying the Energy and Water Development Appropriations Act, 2002 (P.L. 107–66) directed the Secretary to ''include in the annual report to Congress on LDRD activities an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that support science and technology development that benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies.'' The Department has implemented this guidance by including the following language into its standard project proposal and funding acceptance documents that it requires the funding WFO agencies to sign: ''The Department of Energy believes that LDRD efforts provide opportunities in research that are instrumental in maintaining cutting edge science capabilities that benefit all of the customers at the laboratory. The Department will conclude that by providing funds to DOE to perform work, you acknowledge that such activities are beneficial to your organization and consistent with appropriations acts that provide funds to you.'' This is too facile a solution for the Department. According to a review conducted by this Committee's investigative staff, only a little more than half of the WFO customers indicated they could reliably certify that DOE's LDRD activities are consistent with the funding agencies' appropriations acts. Nevertheless, most agencies sign the required certification letter to DOE because they see no real alternative. The Committee fully expects that there are terms and conditions attached to the appropriations acts for these other agencies that are being ignored through this so-called ''certification'' process for LDRD work."

The Committee is considering changing the arrangement by which LDRD activities are funded to eliminate these concerns. The results of an ongoing General Accounting Office review will help to inform the Committee's choice. The Committee is receptive to streamlining the annual LDRD report to Congress, which is undoubtedly a significant burden for the Department to prepare and is of little value to this Committee in resolving the concerns identified above. The Department should work with Committee staff to develop a simpler and more useful LDRD report."

107th Congress - House of Representatives Conference Report, (H.R. Rep. No. 107-258 (2002) (Conf. Rep.)). "The conference agreement does not include bill language proposed by either the House or the Senate regarding the Laboratory Directed Research and Development (LDRD) program. The conferees recognize the benefits of LDRD and expect LDRD activities to continue at previously authorized levels. However, when accepting funds from another Federal agency that will be used for LDRD activities, the Department of Energy shall notify that agency in writing how much will be used for LDRD activities. In addition, the conferees direct the Secretary of Energy to include in the annual report to Congress on all LDRD activities an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies."

Utilization of Department of Energy National Laboratories and Sites in Support of Homeland Security Activities - FY 2002 Department of Homeland Security Act (Pub. L. No. 107-296, Section 309, 6 USC § 189(6) (f)). Laboratory Directed Research and Development by the Department of Energy.--No funds authorized to be appropriated or otherwise made available to the Department in any fiscal year may be obligated or expended

for laboratory directed research and development activities carried out by the Department of Energy unless such activities support the missions of the Department of Homeland Security.

106th Congress - House of Representatives Conference Report, (H.R. Rep. No. 106-988 (2001) (Conf. Rep.)).
"The conference agreement includes an allowance of six percent for the laboratory directed research and development (LDRD) program and two percent for nuclear weapons production plants. Travel costs for LDRD are exempt from the contractor travel ceiling. The conferees direct the Department's Chief Financial Officer to develop and execute a financial accounting report of LDRD expenditures by laboratory and weapons production plant. This report due to the House and Senate Committees on Appropriations by December 31, 2000, and each year thereafter, should provide costs by personnel salaries, equipment, and travel.[6] The Department should work with the Committees on the specific information to be included in the report."

Section 3136(b) (1) of the National Defense Authorization Act for Fiscal Year 1997 (Pub. L. No. 104-201).
"The Secretary of Energy shall annually submit to the congressional defense committees a report on the funds expended during the preceding fiscal year on activities under the Department of Energy Laboratory Directed Research and Development Program. The purpose of the report is to permit an assessment of the extent to which such activities support the national security mission of the Department of Energy."

[6]The offer to streamline the LDRD report resulted in the Department and Hill contacts agreeing not to require costs be provided by personnel salaries, equipment and travel.

Appendix 2. Listing of FY 2011 LDRD, PDRD & SDRD Projects

United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2011		
Project ID	**Project Name**	**FY 2011 Cost**
ANL - Argonne National Lab		
P/ANL2008-190	Feasibility Studies and Pre-Conceptual Design of Continuous Wave (CW) Superconducting RF Deflecting Cavities for the Generation of Short X-ray Pulses at the Advanced Photon Source	$775,625
P/ANL2008-195	NEMS Based Nano-sensors for Basic Science Research	$203,584
P/ANL2009-035	Explosive Nucleosynthesis of Heavy Elements	$77,971
P/ANL2009-047	Novel Computing Methodologies for the Simulation of Complex Molecular Systems	$201,720
P/ANL2009-050	Catalyst Station at APS Beamline 9-BM	$48,817
P/ANL2009-068	Coherent Diffraction Imaging of Complex Polymeric Networks	$136,022
P/ANL2009-070	Characterization of Proteins from Anaeromyxobacter Dehalogenans, A Newly Identified Bacterium of Metabolic and Respiratory Versatility Important for Bioremediation	$162,139
P/ANL2009-071	Large Scale Beam Dynamics Optimization for More Efficient Operation of Large User Facilities	$69,411
P/ANL2009-076	Photocathodes Development for Accelerator R&D	$148,895
P/ANL2009-083	Local Probes of Novel Electronic States at Complex Oxide Interfaces	$168,067
P/ANL2009-097	Integrated Biofuel/Engine Design	$739,744
P/ANL2009-111	Three-Dimensional Metamaterials with Negative Refractive Index	$124,861
P/ANL2009-115	Advanced Cathode Materials for high Performance Lithium Ion Batteries	$326,490
P/ANL2009-138	Ultra-Sensitive Protein Biomarker Screening Assay for Early Stage Disease Diagnosis	$168,203
P/ANL2009-146	Laboratory Simulations of Plasma Conditions Near Active Galactic Nuclei and Black Holes	$67,498
P/ANL2009-155	New Framework for Electromagnetic Simulations on Exascale Supercomputers	$181,589
P/ANL2009-156	Metagenomics-enabled Discovery of Protein Function	$151,965
P/ANL2009-158	Advances in 2 Kelvin Superconducting Cavities for Future Accelerators	$256,626
P/ANL2009-171	Combinatorial Deletions to Produce a Minimal Strain of Bacillus Subtilis	$170,813

P/ANL2009-180	Advancing the Frontiers of Computational Design of Materials	$287,562
P/ANL2009-186	Characterization of Microbial Community Dynamics	$180,202
P/ANL2009-190	Single Photon Receiver Using Abrikosov Vortices	$96,285
P/ANL2009-204	Engineering Nanostructures Atom by Atom for Optical Activity and Quantum Coherence	$117,375
P/ANL2009-209	Physics of the Superinsulating State	$193,674
P/ANL2009-214	Materials Theory	$94,630
P/ANL2010-003	Magneto-Vibrational Energy Conversion at the Nanoscale	$140,127
P/ANL2010-010	Laser Manipulation of Nuclear Spin Embedded in Noble-Gas Ice	$170,574
P/ANL2010-029	Single Quantum Flux Mangnetometer	$171,140
P/ANL2010-042	Emerging Technologies for Scientific Databases	$156,879
P/ANL2010-043	Low Mass Optical Read-out for High Data Bandwidth Systems	$200,275
P/ANL2010-044	Novel Power System Operations Methods for Wind-powered Plug-in Hybrid Electric Vehicles	$240,979
P/ANL2010-047	Optimization of Luminescent Solar Concentrators	$319,541
P/ANL2010-049	Compact Solid-state Sources of Coherent THz-radiation	$131,842
P/ANL2010-050	Highly Efficient SERS-active Substrate with Designer Hot-spots and Multiple-stage Light Amplification	$137,915
P/ANL2010-063	Tactile MEMS-based Sensor	$106,398
P/ANL2010-073	Polymerized Ionic Liquid Nanostructures for Biocatalytic Production	$154,888
P/ANL2010-074	Combined Approaches Towards a Hierarchical Understanding of Battery Materials	$267,638
P/ANL2010-093	Molecular Characterization of Spore Coat Proteins	$77,078
P/ANL2010-117	Development of Picosecond X-ray Pulses at the APS using MEMS-based X-ray Optics	$320,480
P/ANL2010-119	Development of a High Throughput Approach to Soil Physical and Chemical Characterization in Tandem with Soil Metagenome Analysis	$133,857
P/ANL2010-129	Layered Oxides for Thermoelectric Energy Conversion	$130,009
P/ANL2010-131	Accelerating the MG-RAST Metagenomics Pipeline	$792,950
P/ANL2010-137	Novel Bifunctional Low-Temperature Catalysts at the Sub-nanometer Scale	$176,330
P/ANL2010-138	Trapped Field Magnets: A Paradigm Shift for Applications of High-field Magnets at a Synchrotron	$112,915
P/ANL2010-139	High-throughput Reconstruction of Metabolic Models for Organisms with Applications in Energy, Bioremediation, and Carbon Sequestration	$215,009

P/ANL2010-156	Study of Superconducting Films by Atomic Layer Deposition	$171,250
P/ANL2010-158	Converting CO2 to Fuel through Functionalized MOFs	$188,995
P/ANL2010-161	The Biochemistry of Plant-fungal Symbiotic Relationships	$169,142
P/ANL2010-167	Probing Catalytic Transient Intermediate in Ultrafast Time Domain	$225,816
P/ANL2010-175	Detection of Low Copy Number of Pathogenic Microbes by Litmus Strip	$165,599
P/ANL2010-181	Development of High Power Targets for Isotope Production with Low Energy Beams	$39,072
P/ANL2010-183	X-ray Nanoimaging for Life Sciences	$273,107
P/ANL2010-184	Homogeneous Catalysis of Water Oxidation for Photochemical Energy Storage	$200,412
P/ANL2010-185	Beyond Li-ion Battery Technology for Energy Storage	$1,917,953
P/ANL2010-188	Nanoscale Architectures for Energy Storage	$506,258
P/ANL2010-190	Investigation of Novel Relativistic Quantum States in Iridates	$324,647
P/ANL2010-191	Process Engineering Research for Scalable Energy Storage Materials	$455,277
P/ANL2010-192	Microscopic Building Blocks of a Better Lithium-ion Battery	$111,774
P/ANL2010-193	Real-life Imaging: Before and After the Microscope	$219,228
P/ANL2010-194	Acceleration of Cloud Microphysical Retrievals for Climate Models	$220,808
P/ANL2010-195	Simultaneous Ecological Assessment and Characterization of Novel Proteins from a Soil Microbial Community	$571,921
P/ANL2010-196	Atomistically-Informed Mesoscale Simulation of Gradient Nuclear-Fuel Microstructure	$466,686
P/ANL2010-197	Controlled Heterogeneity of Materials for Energy Applications	$536,313
P/ANL2010-198	Molecular and Fluidic Transport in Nanostructured Soft Materials and Composites	$340,708
P/ANL2010-199	Open GATS: An Open Unified Framework for Global Address and Task Space Computing in the Exascale Era	$422,432
P/ANL2010-201	Near-Term Spent Nuclear Fuel Disposal Using Accelerator Drive System	$392,679
P/ANL2010-202	The Rational Synthesis of Kinetically Stabilized, Higher Order Inorganic Materials for Catalysis	$94,555
P/ANL2010-204	Spin and charge dynamics in oxide heterostructures	$414,951

P/ANL2011-005	Tunnel-Diode Oscillator Detection Technique for Ultrasensitive Magnetometery and Resistivity Measurements of Microscopic Samples	$67,228
P/ANL2011-012	Synthesis, Characterization and Properties of Fast Acting Amorphous Drugs	$102,598
P/ANL2011-022	From Plastic Bags to High-performance Lubrication Additives: A Green Chemistry Solution to Energy Efficiency and Environmental Challenges in Transportation	$150,026
P/ANL2011-023	Tuning Electronic Structure at High Pressures: Towards Novel Materials Discovery from X-ray Science Under Extreme Conditions	$106,820
P/ANL2011-027	Data Encryption and Compression for Cybersecurity Applications	$44,574
P/ANL2011-038	Runtime Support for Integrating MPI and Accelerator Programming Models for Exascale Systems	$179,409
P/ANL2011-052	Toward Understanding Cloud Processes and Uncertainty Modeling in Next-Generation High-Resolution Climate Models	$220,671
P/ANL2011-060	Soft Catalysts for Green Chemistry and Energy Applications	$599,060
P/ANL2011-063	Development of In Situ Radioactive Materials Probes using High-energy X-rays	$296,641
P/ANL2011-067	Fast X-Ray Detectors Based on Multichannel Plates	$254,324
P/ANL2011-071	Achieving Efficient Thermal Energy Transport with One-dimensional Polymer Nanofibres	$147,052
P/ANL2011-079	Performance of the Nested Regional Climate Model over the U.S. Midwest	$124,387
P/ANL2011-083	Guided Discovery of Crystalline Molecular Materials for Advanced Energy, Information and Communication Technologies	$237,977
P/ANL2011-093	New Technologies for Label-free Antibody-based Multiplexed Biosensors	$105,854
P/ANL2011-097	Dynamics of Spin-polarized Carriers in New Spin Electronic Materials and Devices	$80,175
P/ANL2011-101	Reactive Synthesis of Metastable Materials	$430,527
P/ANL2011-104	High-performance X-ray Optics Fabrication Using Self-assembled Nanostructures	$161,441
P/ANL2011-106	Exascale Data Analysis for Multiphysics Computational Science	$206,306
P/ANL2011-109	Architectures and Algorithms for Protecting Sensitive Information in Mobile Wireless and Sensing Environments	$176,103

P/ANL2011-110	Development of a Design Concept for a Ring Imaging Cherenkov Detector	$73,114
P/ANL2011-116	Synthesis of New Sodium Layered Oxide Cathode Materials for Ambient Temperature Sodium Batteries	$110,918
P/ANL2011-121	Multilevel Optimization Tools for the Simulation, Detection, and Mitigation of Cyber Attacks	$183,417
P/ANL2011-123	Next Generation Multicomponent Nanocatalysts: in situ Study of the Growth and Function	$194,540
P/ANL2011-126	Development of Software Infrastructure for the Simulation of Microbial Communities on HPC Architectures	$221,872
P/ANL2011-129	Evaluation of Microtopography Effects on the Terrestrial Biosphere and Hydrosphere Under Regional Climate Change	$81,039
P/ANL2011-134	Inorganic Synthons: Toward Scalable Materials Design, Discovery, and Creation	$548,520
P/ANL2011-140	Detailed and Reduced Chemical Kinetics of Green Fuels for Compression Ignition Engine Modeling	$163,926
P/ANL2011-147	Magnetomechanical Actuation of Membrane Channels and Cellular Signaling via Direct Energy Transfer	$171,891
P/ANL2011-149	Next Generation Data Exploration: Intelligence in Data Analysis, Visualization and Mining	$137,613
P/ANL2011-153	Development of Wireless Data and Power Techniques for Large Instrumentation Systems	$177,877
P/ANL2011-169	Enhancing Smart Grid Cyber Security with Near Real-time Message Passing Techniques	$111,129
P/ANL2011-170	Development of Grating Interferometers for Quantitative High-energy X-ray Imaging and for Real-time Wavefront Monitoring	$264,731
P/ANL2011-188	Synthesis Science of Functional Layered Complex Oxides	$676,397
P/ANL2011-193	Ultra-small Nanoparticles: A New Opportunity for Discovery of Catalytic Materials for Energy	$185,144
P/ANL2011-196	Will Linking Ultra-large-scale Metagenomics with Models Representing Biogeochemical Cycling Improve Existing Carbon Flux Models	$474,385
P/ANL2011-197	Multiscale Computational Molecular Science	$236,781
P/ANL2011-198	Fundamental Developments in Theory and Modeling of Nanoscale Systems and Phenomena	$145,408
P/ANL2011-199	Oxide Surfaces: Nanoparticles to Single Crystals	$150,308
P/ANL2011-200	Novel materials for active nanostructures	$286,248
P/ANL2011-202	Multifunctional Polymers for Regulating Membrane Function	$148,235

P/ANL2011-203	Enzyme Processes in Energy Production.	$200,577
P/ANL2011-204	Development of Revolver Undulator for APS	$290,497
P/ANL2011-205	High-Power, Ultra-Stable Radio-Frequency Test Apparatus for Superconducting Radio-Frequency (SRF) Deflecting Cavity Testing and Development	$919,170
P/ANL2011-206	High-Power RF Dampers for Superconducting RF Deflecting Cavities	$266,843
P/ANL2011-207	Device Engineering for High-Performance Photocathodes	$200,890
P/ANL2011-208	Chemical Reactions in Li-Air Batteries; Insight from Multiconfiguration Molecular Dynamics	$77,575
P/ANL2011-209	Rare Earth Elements	$251,492
P/ANL2011-210	Improved Catalytic Performance by Applying Electrochemical Control	$59,058
P/ANL2011-211	Beyond-petascale Monte Carlo methods for practical nuclear reactor analyses	$149,133
P/ANL2011-212	Research and Development of Advanced Energy Storage Methodologies	$130,268
P/ANL2011-213	Towards the Exascale Sky	$354,678
P/ANL2011-214	Mobile Device Vulnerability Research	$138,505
P/ANL2011-215	Studies of Thermomechanically Induced Fatigue in Glidcop for Use In Photon Absorbers for High Power Density X-ray Beam Applications	$234,858
P/ANL2011-216	High-Performance Computation: Developing and Testing a 3-D Regional Scale Climate Model in the Ganges Valley, India	$67,603
P/ANL2011-217	Polyelectrolyte Brushes in Multi-Valent Ionic Media	$51,731
	Total Cost for ANL: $29,563,719	
	Total # of Projects for ANL: 123	
	Total Administrative Cost $74,800	
BNL - Brookhaven National Lab		
08-002	Strong Correlated Systems: From Graphene to Quark-Gluon Plasma	$23,184
08-028	Genomic DNA Methylation: The Epigenetic Response of Arabidopsis Thaliana Genome to Long-Term Elevated Atmospheric Temperature and CO2 in Global Warming	$30,353
09-001	Nanoscale Electrode Materials for Lithium Batteries	$600,921
09-002	Bioconversion of Lignocelluloses to Ethanol and Butanol Facilitated by Ionic Liquid Preprocessing	$617,300
09-003	Organic Photovoltaics: Nanostructure, Solvent Annealing and Performance	$766,606
09-004	Surface Chemistry and Electrochemistry of Ethanol	$831,474

09-005	Synergistic Interactions Between Poplar and Endophytic Bacteria to Improve Plant Establishment and Feedstock Production on Marginal Soils	$765,658
10-001	Petascale Data Mining for BNL Data Intensive Sciences	$243,454
10-006	Solar Energy Source Evaluation for Smart Grid Development	$100,289
10-007	High Throughput Quantitative Biochemical Phenotyping	$309,050
10-008	Characterization of Materials in Extreme Environments for Advanced Energy Systems Using the National Synchrotron Light Source	$383,346
10-010	Development of an Ultrafast Electron Diffraction Facility for Condensed Matter Physics Challenges	$174,431
10-012	Design of Pt-free Electrocatalysts for Fuel Cell Oxygen Reduction Reactions	$72,814
10-014	Charge Generation and Transport in Films of Conjugated Polymers for Organic Photovoltaics BNL Part of a Collaborative NREL, BNL, ANL LDRD	$351,997
10-015	Photoelectrochemical Fuel Generation from Water and Carbon Dioxide	$274,215
10-016	Structural Basis of Light Perception by Phytochrome	$143,097
10-017	New Model Organisms for Analysis of Plant Metabolism	$168,286
10-023	Development of Microprobe, Multichannel Optical Multimodality for Biological Tissue Imaging	$130,102
10-025	Development of Large Liquid Argon Time Projection Chambers (LArTPC) for Future Neutrino Experiments	$342,832
10-034	Spin Waves in Artificial Magnonic Crystals: Fabrication, Imaging and Scattering	$150,017
10-038	Atomic Structure and Bonding of Cellulose	$126,496
10-039	EIC Polarized Electron Gun	$214,650
10-040	Development of a Laser System for Driving the Photocathode of the Polarized Electron Source for the EIC	$73,986
10-041	Simulation, Design, and Prototyping of an FEL, for Proof-of-Principle of Coherent Electron Cooling	$61,461
10-042	Realization of an e+A Physics Event Generator for the EIC	$111,158
10-043	Exploring Signatures of Saturation and Universality in e+A Collosions at eRHIC	$154,256
10-044	Electroweak Physics with an Electron Ion Collider	$138,967
10-045	LSST Astrophysics and Cosmology Initiative	$248,733
10-052	Enzymatic Control of Plant Cell Properties that Impact Conversion to Biofuels	$291,563
11-001	Cloud and Precipitation 4D Radar Science	$158,095

11-002	A Novel Approach to Parameterized Sub-Grid Processes in Climate Models	$108,302
11-007	Deciphering the Molecular Mechanisms of Lignin Precursor Transportation	$170,304
11-008	Touchless Micro-Crystallography	$104,387
11-012	Multiscale Complexity of Energy and Material Use: Integrated Assessment of Technology and Policy Alternatives	$107,632
11-016	Indium Iodide (InI) - A Potential Next-Generation Room-Temperature Radiation Detector	$213,392
11-017	Visualization Support Infrastructure for Global Climate Modeling with a Focus on the BNL FASTER Project	$61,446
11-020	Single Crystal Growth of Novel Energy Materials by High Pressure Method	$238,369
11-023	Complex Networks Approach to Power Grid Design and Stability	$103,883
11-025	Protein Microcrystal Dynamics by Coherent X-Ray Scattering	$94,804
11-027	High-Resolution Biological Imaging by X-Ray Diffraction Microscopy	$54,131
11-030	Sub-10 nm Resolution Soft X-Ray Microscopy of Organic Nano-Materials by Novel Diffraction Methods	$61,021
11-032	2D Membrane Solution Scattering for Probing the Structures of Membrane Proteins	$16,801
11-033	Exploring the Role of Glue in Hadron Structure by an Electron Ion Collider	$153,915
11-040	Study of FEL Options for eRHIC	$139,481
11-050	Overcoming Electromagnetic Interference in Simultaneous PET and MRI for Biological and Clinical Imaging	$513,462
11-051	Estrogen Biosynthesis as a Novel Imaging Target with Multiple Applications	$745,473
11-052	Magnetic Nanoparticles as Tracers in Biological Systems	$418,439
11-053	High Throughput Screening in Biological Systems Using Radiometric Approaches	$282,719
11-054	Improving Safety with a Brain-Computer Interface	$324,500
11-055	Astrophysics and Cosmology Initiative	$264,288
	Total Cost for BNL : $12,235,540	
	Total # of Projects for BNL : 50	
	Administrative Cost Paid by Laboratory overhead	
INL - Idaho National Lab		

I07-052	Laser Induced Breakdown Spectroscopy: Development and Application of in-situ Elemental Analysis for Process Streams in Spent Fuel Reprocessing Facilities	$263,055
I08-100	Developing a Next Generation, Risk-Informed Approach for Robust and Resilient Design Development (R2D2)	$209,937
I08-102	Cognitive Network Engine and Simulation Framework,Ph.D. Candidate Proposal for Juan Deaton	$135,533
I09-003	Particle-discrete element model simulation of the coupling between material failure/deformation and fluid generation/flow	$71,845
I09-006	Scaling of Welding Processes	$99,760
I09-007	Advanced Instrumentation for In-pile Detection of Thermal Conductivity	$402,822
I09-009	Enhanced Metal Ion Analysis	$98,792
I09-013	Development of Reactor Physics Sensitivity Analysis, Uncertainty Quantification, and Data Assimilation Capability at INL for Validation Applications	$851,338
I09-019	Advanced Remote Sensing for Energy and Environmental Applications using Unmanned Aerial Vehicles	$286,633
I09-021	Wireless Sensor Testing	$206,910
I09-024	Development of a Small Sample Volume Mechanical Properties Testing Technique for Irradiated Fuels and Materials	$246,486
I09-025	Network Interaction In the Thermoacidophile Alicyclobacillus acidocaldarius In Response to Different Complex Carbon Sources	$190,963
I09-033	Development of a Next-Generation Production Code for Nuclear Reactor System Analysis and Safety Margin Quantification	$450,167
I09-041	Effect of glycosylation on the activity and stability of bacterial enzymes	$99,421
I09-042	Characterization of Fluidized Beds via Pressure-Fluctuation Analysis	$112,111
I09-056	Development of Lignocellulosic Ethanol Production Potential in Idaho	$135,748
I09-059	Characterization of a Consolidated Electrochemical Technique for Separation and Recovery of Actinides from Fission Products in Oxide Fuels	$199,787
I09-066	NEUTRON SPECTROMETER DEVELOPMENT	$194,076
I09-068	On-line Monitoring of Actinide Concentrations for Advanced Aqueous Separation Processes	$265,813
I09-070	Integrated Control System Data Fusion	$400,265

I09-071	Evaluation of Covalent Interactions in Actinide Coordination Compounds	$324,474
I09-084	Measuring Actinide Speciation in High pH Solutions	$217,242
I09-087	Isotope Ratio Measurements Methods for Direct Analysis of Samples	$224,436
I09-090	Addressing the Spectrum of Nuclear Related NDE Needs: A hybrid laser ultrasonic and eddy current approach	$188,345
I09-096	Methodologies for the Design, Analysis, and Validation for Operation of Complex Resilient Networks	$109,574
I09-097	Anomaly Detection, Diagnosis, and Resilient Control	$244,484
I09-101	Dissolution and Extraction Studies of Fission Products in Room Temperature Ionic Liquids and in Supercritical Fluid CO2 and Determination of Radiolytic Stability	$232,325
I09-105	Hybrid Energy System Neural Reactance Dynamic Control System	$232,793
I09-114	Radionuclide Collection-Detection Device for the in situ Remote Monitoring of 99Tc as a Proliferation Indicator	$48,146
I09-117	Develop a Safeguards Approach for INL Pyroprocessing lines for Demonstration to IAEA	$199,642
I10-001	Neptunium redox chemistry in irradiated aqueous nitric acid	$340,615
I10-007	ULTRASONIC TRANSDUCER SENSORS FOR IN-PILE DETECTION OF DIMENSIONAL CHANGES	$383,332
I10-008	Irradiation-Induced Evolution of Defects and Microstructures in Nanocrystalline BCC Mo	$298,604
I10-011	Degradation and Conversion of Lignin Using Extremophilic Systems	$523,671
I10-014	Automated Differential Equation-Based Identification	$140,766
I10-015	Optimization of Ceramic Waste Forms Used for Electrochemical Processing of Spent Nuclear Fuel	$139,329
I10-017	Multiscale Modeling and Simulation of Nuclear Fuel Performance	$1,238,759
I10-022	In-Pile Temperature Monitor and Control for ATR	$192,213
I10-023	Study of preconditioning techniques for Krylov solvers applied to hybrid neutron transport calculations	$60,005
I10-024	Small specimen test techniques for evaluating radiation-induced changes in mechanical properties	$139,475
I10-026	Reversible Gas Phase Reactions for Recovery of Graphite from Recycled HTGR TRISO Fuel	$304,871
I10-027	Comprehensive Thermodynamic Models for Aqueous Partitioning of Actinides from Used Nuclear Fuel.	$250,543

I10-029	3D Spatial Representation in Support of Design Inspection and Verification	$387,422
I10-031	Fickian and Thermal Diffusion in Nuclear Materials from Linear Response Theory and Multiscale Simulations	$55,420
I10-032	Investigation of Molten Bromide Salt Systems for Separation and Recovery of Actinides from Fission Products	$245,204
I10-035	Mesosilicate Supported CO2 Capture Material	$149,607
I10-037	Resilient Condition Assessment Monitoring (ReCAM) System	$316,202
I10-038	Aleatory vs Epistemic Uncertainty in Seismic Hazard Analyses	$87,096
I10-043	Membrane Separation System Research for the HYTEST Facility	$280,551
I10-049	Conversion of light hydrocarbons to fuels and chemicals	$184,854
I10-053	Prediction and Monitoring of CO2 Behavior in Deep Reactive Geologic Formations	$205,153
I10-056	Fabrication of Advanced ODS Alloys using Field Assisted Sintering	$208,630
I10-058	Microstructural Evolution of UO2 and U Under Irradiation	$331,499
I10-059	Feedstock Processing and Energy Storage	$244,727
I10-060	Spatially-correlated microstructural characterization: From centimeters to nanometers	$268,938
I10-064	Multi-Rate Shock Physics Simulation of Blast and Penetration Events in Concrete	$341,261
I10-065	Water and Energy System Interdependency Modeling for Multicriteria Decision Analysis	$410,371
I10-067	Hybrid systems process integration and dynamics studies	$687,165
I10-068	Irradiation Testing and Molecular Modeling of Irradiation-Assisted Diffusion and Microstructural Evolution (FCCI)	$360,540
I10-070	Smart grid impact on commercial nuclear plants	$105,039
I10-073	Next Generation Control System “Smart Grid” Simulation Environment	$602,946
I10-075	Cognitive/Intelligent Wireless Communication Devices	$1,049,428
I10-076	Specific biological responses to nano metal oxides	$285,194
I10-078	Development of Non-Lethal Methods for Enhanced Lipid Recovery from Microalgae	$301,161
I10-079	Transmission Site Suitability Decision Support Technology	$128,131

I10-080	Design and Operational Improvements and LCA in Anaerobic Digestion of Fermented Dairy Manure using a 2-Stage Process	$188,093
I10-081	Design and Testing of a Mars Hopper	$212,580
I10-083	In situ characterization of an oxide film for prediction of stress corrosion cracking susceptibility	$133,885
I10-087	Biological Fixation of CO2 for Fuel and Chemical Production Using Acetogen Intermediary Metabolism	$313,020
I10-088	CAES Vertical Axis Wind Turbine Project	$47,483
I10-090	Development of Thermally Generated in situ Precipitation Barriers due to Subsurface Heat Injection	$239,211
I10-092	Hybrid Osmosis Water Purification Systems Research	$286,031
I10-093	Nuclear Reactor Safety Case Development: Models, Data, and Tools	$1,153,758
I10-094	Advanced Visualization Using Immersive Environments	$182,629
I10-095	Error estimation for stochastic uncertainty quantification	$207,255
I10-096	Object Reconstruction Technique for use in Radiography	$137,007
I11-000	Haptic Tele-Operated End Effector for Hazardous Environments	$341,027
I11-001	Innovative mathematical morphology approach to optical color image analysis and pattern recognition	$206,688
I11-005	Speciation Behavior of Americium Oxidation States for the Separation of Americium from Curium in Nuclear Processing	$297,471
I11-006	Supercritical Fluid Extraction of Actinides from TRISO Reactor Fuels	$243,943
I11-007	Integration of Renewable Energy Resources through Energy Storage and SuperGrid	$238,181
I11-019	Electrochemical Production of Synthesis Gas From CO2	$290,988
I11-022	Electronic Warfare Digital Communications and Network Traffic Modeling	$449,896
I11-023	Development of a simplified soft donor technique for trivalent lanthanide actinide separations	$262,749
I11-031	Mechanisms of self inhibition of catalytic conversion of CO2 to methanol	$343,679
I11-032	Ammonia-based Extraction Methods for the Separation and Purification of Metals	$199,814
I11-033	Reduction and retention of technetium using Fe(II) hydroxides	$299,072
I11-034	Thermite Burn Characteristics in Oxygen-less Environment	$116,727

I11-036	Kolbe Electrolysis of Bio-Oils for the Production of Diesel and Aviation Fuels.	$200,164
I11-037	Development of In Reactor Experiment Configuration for Laser Based Material Properties Measurement	$222,591
I11-038	Dissolution, Extraction, and Separation of Rare Earth Elements using Soft Donor Ligands in Conjunction with Ionic Liquids and Supercritical Carbon Dioxide.	$198,867
I11-041	In-situ micro-Raman spectroscopy and modeling of breakaway oxidation of zircaloy cladding	$211,628
I11-042	Vulnerability Prediction, Discovery and Mitigation	$741,102
I11-043	Characterization of the Nanomechanical Response of Material to Determine Key Variables in Stress Corrosion Cracking	$71,407
I11-045	Multiscale Coupled Hydrogeophysics Modeling-Advancing Understanding of Reactive Transport and Effective Subsurface Environmental Monitoring	$142,306
I11-046	“Known Secure” Sensor Measurements For Detecting Unauthorized Process Manipulation and Falsification of State	$149,243
I11-051	Alternative Processing for Improved UO2 -Based Fuels	$806,817
I11-053	High-Energy Photofission Signatures Study	$79,228
I11-054	Treaty Verification with Photofission-Induced Prompt Signatures	$207,810
I11-055	Spatially Resolved Positron Analysis of Hydride Formation in LWR Fuels with GE-Global Nuclear Fuels	$239,498
I11-059	Unconventional Radiation Detection Methods for Nuclear Nonproliferation,	$256,911
I11-060	SMC Advanced Armor Materials and Systems R&D and D&D	$484,188
I11-061	Advanced Modeling and Simulation Concepts for ATR	$687,728
I11-062	Full-Scope Human System Simulation Laboratory for Plant-Specific and Generic NPP Simulator Models Studies	$250,040
I11-064	Dynamic Thermo-Mechanical Energy Conversion Simulation	$214,530
I11-065	Development and Demonstration for National Fuel Efficiency	$111,912
I11-066	Targeted Energy Management Toolset for Comfort and Savings Based on Advanced Computational Intelligence Techniques	$113,019
I11-067	Pyro Processing Facility (FCF) Nuclear Material and Environmental Signature Baseline for MCNP Modeling Verification	$98,152

I11-068	Science Based Simulation Model of Human Performance for Human Reliability Analysis	$92,332
I11-069	Industrial control system threat axis analysis to characterize and quantify malicious intent from a threat actor	$323,217
I11-074	Uncertainty Analysis for Multiscale Models of Nuclear Fuel Performance	$133,022
I11-075	Uncertainty Analysis of Mesoscale Models of Radiation Effects in Materials	$54,319
I11-076	Exploratory Nuclear Reactor Safety Analysis and Visualization via Integrated Topological and Geometric Techniques	$87,121
I11-077	Prototype INL Wildland Fire Early Warning and Situational Awareness System	$87,590
I11-078	Enabling Dynamic Spectrum Access in Long Term Evolution (LTE) Networks	$31,486
	Total Cost for INL: $30,879,060	
	Total # of Projects for INL: 115	
	Total Administrative Cost $467,785	
KCP - Kansas City Plant		
10EDGE002-703340	NSMC PDRD Project	$14,430
10EDGE006-703373	NSMC PDRD Project	$6,445
11EDGE001-704101	NSMC PDRD Project	$404,975
11EDGE002-704103	NSMC PDRD Project	$135,558
11EDGE003-704106	NSMC PDRD Project	$119,787
11EDGE004-704107	NSMC PDRD Project	$34,693
11EDGE005-704110	NSMC PDRD Project	$152,904
11EDGE006-704111	NSMC PDRD Project	$10,704
11EDGE007-704112	NSMC PDRD Project	$49,275
11EDGE008-704113	NSMC PDRD Project	$102,480
11EDGE009-704115	NSMC PDRD Project	$217,413
11EDGE010-704117	NSMC PDRD Project	$42,777
11EDGE011-704120	NSMC PDRD Project	$90,694
11EDGE012-704121	NSMC PDRD Project	$17,945
11EDGE013-704122	NSMC PDRD Project	$75,218
11EDGE014-704124	NSMC PDRD Project	$113,275
11EDGE015-704127	NSMC PDRD Project	$160,688
11EDGE016-704128	NSMC PDRD Project	$11,008
11EDGE017-704129	NSMC PDRD Project	$47,665
11EDGE018-704135	NSMC PDRD Project	$48,438
11EDGE019-704138	NSMC PDRD Project	$12,847
11EDGE020-704139	NSMC PDRD Project	$19,950

11EDGE021-704145	NSMC PDRD Project	$95,878
11EDGE022-704146	NSMC PDRD Project	$138,148
11EDGE023-704147	NSMC PDRD Project	$50,087
11EDGE024-704152	NSMC PDRD Project	$38,222
11EDGE025-704237	NSMC PDRD Project	$57,336
11EDGE026-704249	NSMC PDRD Project	$30,283
KCP08781-703745	Rapid Response Technology Evaluation	$158,252
KCP09829-703888	LTCC Capacitor Technology	$1,919
KCP09838-703892	Diamond Thin Film Heat Sinks	$4,372
KCP09840-703894	Non Destructive Slapper Test Methods	$4,053
KCP09850-703911	Optical Monitor System	$168
KCP09988-703773	NSMC PDRD Project	$3,235
KCP101005-703212	BNNT	$243,050
KCP101007-703215	Conjugated Dienne Elastomer Development	$406,307
KCP101011-703236	Aerosol Jet Printing	$199,997
KCP101047-703254	Gold-tin Die-Attach Ultrasonic	$3,734
KCP101049-703374	Suitcase Comm System	$2,394
KCP101053-703264	ASIC Wire Bonding	$261
KCP101165-703305	Control of Resonant Plates	$11,621
KCP101231-704085	Semi-Custom Electrical Contact	$30,522
KCP101328-703365	Foundation BusMon Simulation	$617
KCP10962-703204	GTS Acid Cleaning Elimination	$261,595
KCP10970-703203	Spin Forming Evaluation	$3,233
KCP10972-703226	FO Embedded Data Acquisition	$223,100
KCP10998-703244	Super Getters Based on MOF's	$214,914
KCP111040-704009	EM Underground Modeling	$103,695
KCP111042-704500	KO Short Term Projects	$101,339
KCP111048-704010	Look Ahead Sensor Development	$236,677
KCP111055-704047	Next Generation Wide Angle Laser Transmitter	$168,018
KCP111065-704048	Next Generation Ground Truth Feedback	$113,885
KCP111069-704056	Weld Residual Stress Technique	$142,105
KCP111070-704034	Burr-Free Machining	$53,189
KCP111098-704024	Laser Weld Automation	$97,674
KCP111103-704061	Q-Measurements	$56,433
KCP111110-704064	Shock Tester Design	$110,647
KCP111134-704081	Light Sensing RFID Tags	$85,410
KCP111140-704058	Wear-resistant Ceramic Evaluation	$126,253
KCP111141-704076	Alternate Foams & Encapsulents	$131,562
KCP111143-704065	Pb Free Component Refinishing	$16,911
KCP111150-704066	Modeling of Micro Materials	$77,449
KCP111151-704007	Radar RX with Thin Film Passives	$352,268
KCP111167-704073	Embedded Passives Flex Cable	$26,338

KCP111168-703390	Shell Mfg Development	$676,112
KCP111169-704002	DLC Heat Sinks	$296,466
KCP111170-704079	PXI Data Collection System	$107,722
KCP111173-704069	New Test Capability for Radars	$7,743
KCP111175-704013	LDI for Precision Graphics	$12,028
KCP111176-704004	Hermetically Sealed F/O	$24,284
KCP111192-704091	Vibration Damage Assessment	$52,526
KCP111198-704005	Adhesion of Thin Film on LTCC	$32,565
KCP111206-704067	RFIC MCM Rework	$146,104
KCP111207-704074	3D Flex Cables	$32,734
KCP111218-704083	Q-Enhanced Filters	$65,750
KCP111219-704052	MILES Rifle	$153,619
KCP111236-704032	SL Wave Classification	$55,833
KCP111237-704070	DWDM Passive Position Sensor	$128,713
KCP111240-704075	Micro-reactors	$171,619
	Total Cost for KCP: $8,036,138	
	Total # of Projects for KCP: 79	
	Total Administrative Cost $464,353	
LANL - Los Alamos National Lab		
LANL-20080727PRD2	Multi-scale Analysis of Multi-physical Transport Processes of Electroosmosis in Porous Media	$110,209
LANL-20080728PRD2	Dissipation and Decoherence in Complex Many-Body Systems	$188,172
LANL-20080784PRD3	Bio-Directed Assembly of Multicolored One-Dimensional Quantum Dot Light-Emitting Devices	$1,290
LANL-20080791PRD4	Local Atomic Arrangements in Phase Change Materials	$39,001
LANL-20080794PRD4	The Kondo Lattice Problem	$37,061
LANL-20080796PRD4	Chiral Metamaterials for Terahertz Frequencies	$17,762
LANL-20080797PRD4	Energy Transfer Processes in Type-Specific Single-Walled Carbon Nanotubes	$47,061
LANL-20090006DR	Synthetic Cognition through Peta-Scale Models of the Primate Visual Cortex	$1,679,081
LANL-20090017DR	Predictive Design of Noble Metal Nanoclusters	$1,541,046
LANL-20090022DR	Understanding Anisotropy to Develop Superconductors by Design	$1,777,113
LANL-20090035DR	Spatial-temporal Frontiers of Atomistic Simulations in the Petaflop Computational World	$1,487,550
LANL-20090053DR	Double Beta Decay	$1,916,800
LANL-20090058DR	Turbulence By Design	$1,700,795
LANL-20090061DR	Enhance Radiation Damage Resistance via Manipulation of the Properties of Nanoscale Materials	$1,525,743

LANL-20090098DR	Understanding Drug Resistance and Co-infectivity in HIV and TB Infections	$1,826,322
LANL-20090104DR	RADIUS: Rapid Automated Decomposition of Images for Ubiquitous Sensing	$1,436,307
LANL-20090117DR	Distributed Metabolic Regulation: the Key to Synthetic Biology for Carbon Neutral Fuels	$1,448,794
LANL-20090163ER	Using Small Molecules to Control RNA Conformations	$374,883
LANL-20090174ER	Understanding the Feedback of Active Galaxies in Galaxy Clusters	$394,892
LANL-20090176ER	The First Characterization of Large Interstellar Dust	$285,309
LANL-20090186ER	Molecular Scale Shock Response of Explosive1	$376,598
LANL-20090187ER	Multifunctional Materials	$377,244
LANL-20090189ER	Efficient and Selective Photon Detection	$362,521
LANL-20090202ER	Functional Gene Discovery Using RNAi-based Gene Silencing	$414,845
LANL-20090210ER	Developing Adaptive High-Order Divergence-Free Methods for Magneto-Hydrodynamics Turbulence Simulations	$357,912
LANL-20090217ER	Solid Helium-4: A Supersolid or Quantum Glass	$395,941
LANL-20090250ER	Efficient Interdiction	$361,971
LANL-20090253ER	Photodynamics and Photochemistry of Carbon Nanotube Materials	$357,406
LANL-20090260ER	Compositionally Graded InGaN-based High Efficiency Photovoltaic Devices	$428,273
LANL-20090265ER	A Novel Millimeter-Wave Traveling-Wave Tube Based on an Omniguide Structure	$518,169
LANL-20090269ER	Development of a Muon to Electron Conversion Experiment at LANSCE/MaRIE: Search for Physics beyond the Standard Model	$357,258
LANL-20090284ER	Unconventional Methods for Quantum-enhanced Metrology	$416,365
LANL-20090303ER	First Unambiguous Measurement of Jet Fragmentation and Energy Loss in the Quark Gluon Plasma	$588,178
LANL-20090305ER	A Visionary New Approach to Assess Regional Climate Impacts on Vegetation Survival and Mortality	$347,577
LANL-20090306ER	Breakthroughs in Magnetic Reconnection Enabled by Petaflop Scale Computing	$351,600
LANL-20090312ER	Disentangling Quantum Entaglement	$370,980
LANL-20090321ER	Compact Solid State Tunable THz Source	$483,750
LANL-20090325ER	Plasmonic Bandgap Materials: Fusion of Interparticle and Particle-Photon Interactions at the Nanoscale	$336,102
LANL-20090335ER	Probing the Origin and Consequences of Quantum Critical Fluctuations	$357,156

LANL-20090363ER	Membrane Micro-chromatography: A Novel Approach to Preparative Nucleic Acid Sample Processing	$433,266
LANL-20090369ER	Linear Scaling Quantum-Based Interatomic Potentials for Energetic Materials	$369,765
LANL-20090393ER	Transparent Organic Solar Cells	$417,913
LANL-20090394ER	Backward Stimulated Raman and Brillouin Scattering of Laser in the Collisional Regime	$321,510
LANL-20090397ER	Uranium Imido Complexes as Catalysts for the Reduction of Carbon Dioxide	$376,944
LANL-20090410ER	Transport in Magnetized Dense Plasmas for Magneto-Inertial Fusion	$333,546
LANL-20090420ER	A Hybrid Transport-Diffusion Method for Radiation Hydrodynamics	$374,642
LANL-20090424ER	Robust 3D moving mesh adaptation based on Monge-Kantorovich optimization	$358,796
LANL-20090425ER	Isotopic Tracer for Climate Relevant Secondary Organic Aerosol	$449,509
LANL-20090443ER	Evolving a Thermostable Cellulase by Internal Destabilization and Evolution	$384,864
LANL-20090466ER	Novel Cone Targets for Efficient Energetic Ion Acceleration for Light Ion-Driven Fast Ignition Fusion	$435,919
LANL-20090475DR	Seaborg Institute Fellows	$1,266,420
LANL-20090476DR	New and Enhanced Capabilities in Quantum Information Processing	$496,319
LANL-20090477DR	Revolutionary Science at the Intersection of Extreme and Transient Events, Natural Hazards, and National Security	$1,391,908
LANL-20090491PRD1	Unconventional Superconductivity in Heavy Fermion Materials	$43,208
LANL-20090493PRD1	Disorder in Frustrated Systems	$62,812
LANL-20090498PRD2	Measurement of Transverse Single-Spin Asymmetries of Neutral Pion and Eta Meson Production in Polarized p+p Collisions Using the PHENIX Detector at RHIC	$216,202
LANL-20090513PRD1	In situ X-ray Microdiffraction Study of Nanomechanical Behavior	$82,711
LANL-20090514PRD1	Novel Fabrication of Metal-Semiconductor Heterostructured Nanowires	$50,714
LANL-20090516PRD1	Multiscale Variational Approaches to Markov Random Fields	$59,270
LANL-20090518ER	General Relativity as a Probe of Cosmology	$181,702
LANL-20090519PRD2	Nanogenerators Driven by Both Magnetic and Mechanical Waves	$83,021

LANL-20090520PRD2	Quantum Information Processing: Capabilities and Limitations	$193,604
LANL-20090521PRD2	Exploring the Expanding Universe and the Nature of Dark Energy	$174,790
LANL-20090523PRD2	Hybrid Semiconductor-metal Nanostructures for Amplification of Surface Plasmons	$39,644
LANL-20090525PRD2	Non-equilibrium Phenomena in Physics, Biology and Computer Science	$57,703
LANL-20090526PRD2	Carbon and Oxygen Isotopic Variability in Succulent Plants and Their Spines: A New Tool for Climate and Ecosystem Studies in Desert Regions	$100,162
LANL-20090527PRD2	Probing Molecular Physics of Biological Nano-channels: from Viruses to Biosensors	$30,094
LANL-20090528PRD2	Theoretical/Computational Research on Particle Acceleration by Intense Laser Pulse	$148,075
LANL-20090530PRD2	Theoretical Investigations of Ribosome Dynamics	$144,061
LANL-20090532PRD3	Single-Nanocrystal Photon-Correlation Studies of Carrier Multiplication	$77,862
LANL-20090533PRD3	Correlation in Ultracold and Ultrafast Systems	$49,304
LANL-20090534PRD3	New Generation of Fluorescent Probes for In-Vivo Imaging	$98,883
LANL-20090535PRD3	Experimental Studies On the Origin of Nucleon Spin	$187,386
LANL-20090536PRD3	Cold-Atom-Based Theory and Quantum Simulations for Many-body Physics	$70,886
LANL-20090537PRD3	Casimir Interactions and Their Applications to Nanomachines and Atom-Chips	$172,152
LANL-20090538PRD3	Biocompatibility and Nanotoxicity: Characterization and Manipulation of Interactions at the Biomolecule-Nanomaterial Interface	$147,512
LANL-20090539PRD4	Study of Chemical and Electronic Structure in Metal-Containing Nanoparticles and Nanoclusters	$101,304
LANL-20090540PRD4	Dopant Distribution and Interface Studies of Si and Ge Nanowire Heterostructures	$164,920
LANL-20090542PRD4	Control of Shape, Dispersion and Size of Disorder in High-Temperature Superconducting Films and its Effect on in-Field Superconducting Properties	$111,492
LANL-20100006DR	Nanoscale Superconductivity for Single Photon Detection	$1,748,711
LANL-20100015DR	New Generation Hydrodynamic Methods: from Art to Science (U)	$1,139,405
LANL-20100023DR	Cosmological Signatures of Physics Beyond the Standard Model: Petascale Cosmology Meets the Great Surveys	$1,648,466

LANL-20100025DR	Integrated Experimentation and Hybrid Modeling for Prediction and Control of Multiphase Flow and Reaction in CO2 Injection and Storage	$1,720,512
LANL-20100026DR	Isolating the Influence of Kinetic and Spatial Effects on Dynamic Damage Evolution	$1,729,451
LANL-20100027DR	Transformative Bioassessment of Engineered Nanomaterials: Materials by Design	$1,742,708
LANL-20100030DR	Optimization and Control Theory for Smart Grids	$1,743,852
LANL-20100040DR	Intelligent Wind Turbines	$2,113,217
LANL-20100043DR	Understanding and Controlling Complex States Emerging from Frustration	$2,042,122
LANL-20100044DR	First Principles Predictive Capabilities for Transuranic Materials: Mott Insulators to Correlated Metals	$1,643,347
LANL-20100045DR	Information Science for Understanding Complex Quantum Matter	$1,675,155
LANL-20100048DR	Molecular Forensic Science of Nuclear Materials	$1,733,011
LANL-20100063DR	CLEAN Detection & Identification of Dark Matter	$2,057,836
LANL-20100073DR	Understanding, Exploiting, and Controlling Competing Interactions in Complex Oxides	$1,551,940
LANL-20100089DR	Upgrading Renewable and Sustainable Carbohydrates for Production of High Energy Density Fuels.	$1,608,097
LANL-20100097DR	Probing Brain Dynamics by Ultra-Low Field Magnetic Resonance	$1,806,766
LANL-20100129ER	A Molecular View of Cellulase Activity: A Single-Molecule Imaging and Multi-Scale Dynamics Approach	$357,668
LANL-20100141ER	Earth Tremor, Time Reversal and Earthquake Forecasting	$430,278
LANL-20100144ER	New Generation “Giant” Nanocrystal Quantum Dots for Transformational Breakthrough in Solid State Lighting	$425,822
LANL-20100160ER	New Catalytic Methods for Selective C-C Bond Cleavage in Lignin: Towards Sustainable and Renewable Chemicals and Fuels	$343,108
LANL-20100172ER	Probing the Structure of Superconducting States with Rotating Magnetic Field	$438,487
LANL-20100182ER	Biocatalysts: A Green Chemistry Approach to Industrially Relevant Compounds	$418,397
LANL-20100183ER	Ultrafast Cathodoluminescence for Improved Gamma-Ray Scintillators	$424,614
LANL-20100184ER	Characterizing the Th-229 Isomer: A Nuclear Clock Candidate	$480,881
LANL-20100189ER	A Plasma-Based Ultrafast THz Source	$339,733
LANL-20100191ER	Hawking-Unruh Effect in Atomic Bose-Einstein Condensates	$382,392

LANL-20100210ER	Understanding and Controlling Complex States of Matter in New Iron-arsenide Superconductors through Strain and Disorder	$488,626
LANL-20100215ER	Bacterial Invasion Reconstructed Molecule by Molecule	$361,578
LANL-20100228ER	Developing Actinide Catalysis for Cleaning Dirty Fossil Feedstocks	$496,893
LANL-20100230ER	Planetary Analog Geochemical Explorations with Laser-Induced Breakdown and Raman Spectroscopies	$383,885
LANL-20100237ER	One-Dimensional Nanomaterials for Enhanced Solar Conversion	$402,113
LANL-20100241ER	A Metamaterial-Inspired Approach to RF Energy Harvesting	$444,134
LANL-20100257ER	Metabolic Regulation of Light-harvesting and Energy Transfer	$366,010
LANL-20100261ER	Electron Spin Injection, Transport and Detection in Semiconductor Nanowires	$415,963
LANL-20100262ER	Ultra High Quality Electron Source for Next Generation Vacuum Electronic Devices	$376,929
LANL-20100273ER	A Novel Brownian-Poisson Algorithm for Modeling Ion Transport through Artificial Ion Channels	$370,689
LANL-20100285ER	Transformational Approach for the Fabrication of Semiconductor Nanowires: “Flow” Solution-Liquid-Solid Growth	$381,698
LANL-20100296ER	Cold Atoms in Quantum Periodic Potentials	$370,082
LANL-20100298ER	Unraveling Electron-Boson Interactions in High-Tc Superconductors With Ultrafast Infrared Spectroscopy	$365,555
LANL-20100302ER	BEC Waveguide Optics	$360,236
LANL-20100308ER	GO FISH, A Smart Capture and Detection Strategy for Intact and Viable Pathogens	$361,349
LANL-20100310ER	Digital Trigger for the High Altitude Water Cherenkov (HAWC) Observatory	$519,017
LANL-20100312ER	Understanding Arctic Hydrologic Response to Climate Change	$412,566
LANL-20100328ER	Deciphering the Controlled Chaos of Intrinsically Disordered Proteins	$382,744
LANL-20100366ER	Ultra-Fast DFT-Quality Forces for Molecular Dynamics Simulations of Materials	$387,757
LANL-20100389ER	Solid State Neutron Detector	$343,749
LANL-20100394ER	Probing the Origin of Matter in the Universe	$411,203
LANL-20100395ER	Parallel Algorithms for Robust Phylogenetic Inference	$376,584
LANL-20100413ER	Revolutionizing Short-Pulse Laser Generation using Stimulated Raman Scattering	$385,946

LANL-20100438ER	Surface Fitting for Thermodynamically Consistent Evaluation of Tabular Equations of State	$369,434
LANL-20100441ER	LES Modeling for Predictive Simulations of Material Mixing	$404,842
LANL-20100456ER	Algal Lipid Regulatory Networks	$338,926
LANL-20100460ER	Robust Unsupervised Operation Under Uncertainty Through Information Theoretic Optimization of Complex Systems.	$372,221
LANL-20100469ER	Controlling Charge Recombination Processes in “Giant” Nanocrystal Quantum Dots Toward High-Efficiency Solid-State Lighting	$378,380
LANL-20100479ER	Modeling the Global Circulation and Evolution of Influenza A Virus	$388,162
LANL-20100531DR	Bridging Equilibrium and Non-equilibrium Statistical Physics	$845,698
LANL-20100594PRD1	Control/Path Planning Strategies for Nonholonomic, High-Speed, Autonomous Unmanned Ground Vehicles	$174,762
LANL-20100595PRD1	Development of an Acoustic Exotic Metamaterial Slab Using the Acoustic Radiation Force and Micro-streaming of High-order Bessel Helicoidal Beams	$204,120
LANL-20100596PRD1	Atomic Interface Design of Nanocomposites for Extreme Mechanical Loadings	$194,621
LANL-20100598PRD1	Multi-scale Computational Approach for Studying Radiation Resistant Nanoclustered Alloy	$152,565
LANL-20100599PRD1	Extra-Long-Range Energy Transfer in Hybrid Semiconductor-Metal Nanoassemblies	$144,553
LANL-20100601PRD2	Unique Semiconductor Nanowire Heterostructures in Physics and Applications	$227,075
LANL-20100603PRD2	Analysis of Protein Structure-Function Relations in Antibiotic Biosynthesis and Signal Transducing Receptors	$212,116
LANL-20100604PRD2	Quantitative Modeling of Cellular Noise	$210,483
LANL-20100605PRD2	Tracing Fluctuations in the Universe	$120,220
LANL-20100606PRD2	Perfect Fluidity in Universal Quantum Systems	$177,203
LANL-20100607PRD2	Search for CP and CPT Violation in the Neutrino Sector	$160,227
LANL-20100608PRD2	Seeing the Invisible: Observational Signatures of Dark Matter	$180,169
LANL-20100609PRD2	Probing Dark Energy and Modified Gravity via Interactions with Normal Matter	$81,790
LANL-20100610PRD2	Probing Fundamental Physics with Cosmological Surveys	$153,287
LANL-20100611PRD2	Physics of Cosmic Ray Shocks and the High Energy Universe	$118,466

LANL-20100619PRD2	Quantum knowledge: a revolutionary approach to measurement	$172,868
LANL-20100624PRD3	Polymer-Coated Surfactant Micro-reactors for Applications in Chemical Sensing, Contaminant Remediation and Synthetic Biology	$151,575
LANL-20100625PRD3	Roles of Fungi in Terrestrial Ecosystem Carbon Cycling	$135,675
LANL-20100626PRD3	Growth of Actinide-Nanocomposites using Hyperbaric Laser Chemical Vapor Deposition.	$134,789
LANL-20100627PRD3	Stochastic Spatially Explicit HIV Dynamic Models	$151,728
LANL-20100628PRD3	Engineering of Phosphotriesterase Enzymes for Nerve Agent Degradation	$177,967
LANL-20100629PRD3	Non-Condon and State Interaction Effects in Carbon Nanotubes	$196,734
LANL-20100631PRD4	Modeling the Surface Mass Balance and Freshwater Runoff from the Greenland Ice Sheet in a Changing Climate	$176,056
LANL-20100632PRD4	A New Regime of Carrier Multiplication Using Intraband Re-Excitation of Nanocrystals	$140,280
LANL-20100633PRD4	Attosecond Probing of Dynamical States in Solids - Graphene	$145,100
LANL-20100634PRD4	Shockwaves as Diagnostic of Strongly Coupled Plasmas	$140,515
LANL-20100635PRD4	Heavy quarks in Cold Nuclear Matter and in the Quark Gluon Plasma	$175,251
LANL-20100636PRD4	The Formation and Evolution of Black Holes in the Universe	$24,367
LANL-20110009DR	Radioparagenesis: Robust Nuclear Waste Form Design and Novel Materials Discovery	$1,536,800
LANL-20110011DR	Hydrogen Effects in Delta-Stabilized Pu Alloys: Fundamental Thermodynamics and Interactions at Reduced Dimensionality	$1,901,569
LANL-20110012DR	First Reactions: Simple Molecule Chemistry Behind the Shock Front	$1,616,118
LANL-20110014DR	Terrestrial Vegetation, CO2 Emissions, and Climate Dynamics	$1,700,134
LANL-20110027DR	Harnessing Nonlinearity for Transformative Metamaterial Technology	$1,638,926
LANL-20110029DR	Innovative and Validated Sub-micron to Meso-scale Modeling of the Evolution of Interface Structure and Properties under Extreme Strains	$1,779,388
LANL-20110032DR	Multi-Messenger Signals from Low-Mass Supernovae	$1,960,947
LANL-20110034DR	Advanced Metagenomic Analysis to Understand Dynamics of Soil Microbial Community under Conditions of Climate Change	$1,663,230

LANL-20110037DR	A Transformational Fission Measurement and Simulation Capability	$265,985
LANL-20110038DR	Building the Astroinformatics Competency: Finding, Interrogating, and Understanding Cosmic Explosions (U)	$783,214
LANL-20110042DR	Development and Validation of an Advanced Turbulence Transport Model (U)	$587,941
LANL-20110043DR	Probing New Interactions with Neutron Beta Decay	$1,842,118
LANL-20110046DR	Network-Centric Quantum Communications	$1,639,219
LANL-20110051DR	Illuminating the Dark Matter of the Genome: Small RNAs as Novel Targets for Bioterrorism Countermeasures	$1,677,291
LANL-20110067DR	Exploiting Hamiltonian Properties of Beams to Revolutionize X-Ray Free-Electron Laser Architectures	$1,667,323
LANL-20110081DR	Multi-Scale Science Framework for Climate Treaty Verification: Attributing and Tracking Greenhouse Gas Fluxes Using Co-Emitted Signatures	$1,707,991
LANL-20110083DR	Next Generation Ionic Liquids for Plutonium Science, Separation, and Production	$1,251,813
LANL-20110093DR	Multi-Perspective Network-Scale Modeling & Detection for Cyber Systems	$1,622,466
LANL-20110098ER	Jet Probes of New Physics at RHIC and at the LHC	$353,448
LANL-20110108ER	Daylight Imaging with Seismic Noise	$350,110
LANL-20110126ER	Rare Category Detection	$375,096
LANL-20110138ER	Superconducting Vortices in Magnetic Media	$520,051
LANL-20110139ER	Novel Anti-Perovskite Electrolytes for Superionic Lithium Transport	$372,434
LANL-20110141ER	Exploration of Megawatt Heat Pipe Reactor Concepts	$375,836
LANL-20110150ER	Balanced and Unbalanced Turbulent Cascades	$357,408
LANL-20110166ER	Grayscale Flow Cytometry - Multicoil NMR Sensors for Portable Flow Cytometry	$332,174
LANL-20110168ER	Biofuel from Magnetic Algae	$376,464
LANL-20110181ER	Exact Renormalization Method for Frustrated Systems and Optimization	$292,534
LANL-20110184ER	Understanding Thunderstorm Effects on the Ionosphere: a New Approach to Investigate Possible Convective and Electrical Coupling Mechanisms	$358,717
LANL-20110189ER	Computational Modeling of Topo-Taxis: Directing the Motion of Bacteria and Cells with Microfabricated Topologies	$358,301
LANL-20110190ER	Understanding Earth's Deep Water Cycle: Neutron Diffraction and Calorimetric Studies of Hydrous Minerals	$426,241
LANL-20110195ER	Algorithmic Co-Design: Paradigms for Unstructured Problems on Accelerated Architectures	$373,608

LANL-20110212ER	Quasiparticle Scattering for Multiscale Modeling of Electronic Materials	$376,202
LANL-20110228ER	Time-Dependent Quantum Molecular Dynamic Simulations of Dense Plasmas Supporting Thomson X-ray Scattering Experiments	$354,116
LANL-20110230ER	Extreme Quantum Simulation: Co-Design from Desktop to Exa-Scale	$431,230
LANL-20110236ER	Solving the Active Site Conundrum in Oxygen Reduction Catalysis	$358,752
LANL-20110246ER	Innovative Process for Making Ultra-thin Dielectrics	$439,084
LANL-20110258ER	Precision Measurement of Atomic Parity Violation in Trapped Yb+	$539,686
LANL-20110264ER	High Density Neuronal Recording Using Nanowire Capacitor Sensors	$305,896
LANL-20110267ER	Full-Frame Programmable Spectral Imagers Based on Micro-Mirror Arrays	$323,204
LANL-20110290ER	Embedding Plasmonic Nanostructures at Semiconductor Interfaces for Enhancing Photovoltaic Efficiency	$581,946
LANL-20110300ER	The Largest Cosmic Implosions: Formation of Supermassive Black Holes	$360,995
LANL-20110306ER	"Listening" to the Noise of a Single Electron Spin: Methods for Fast, Ultra-sensitive, Non-perturbative Noise Spectroscopy	$357,676
LANL-20110311ER	The Terahertz Quantum Hall Effect	$337,826
LANL-20110320ER	Novel Broadband Tera Hertz Sources for Remote Sensing, Security and Spectroscopic Applications	$470,563
LANL-20110338ER	Bio-analogue Catalysts: Evolved Aptazymes for the Hydrolysis of Organophosphorous Compounds	$382,328
LANL-20110341ER	A Compact, Brilliant, Coherent X-ray Source Based on a Dense Relativistic Electron Mirror	$524,237
LANL-20110356ER	Foundational Methods and Experiments in Ultracold Molecular Physics	$416,533
LANL-20110358ER	Developing a Mild Catalytic Route for the Reduction of N2 to NH3	$360,216
LANL-20110363ER	Determination of Fluid Properties at Carbonate Interfaces - An Integrated Experimental and Theoretical Approach	$417,888
LANL-20110411ER	Restoring Neurological Function with Self-assembled Lipid Bilayers	$347,558
LANL-20110412ER	Understanding the Mechanisms of Biological Transport for Nano-technology Applications	$266,546
LANL-20110421ER	Photo-triggerable Immolative Polymers: A New Modality for Radiation Dosimetry	$374,155

LANL-20110425ER	Pyroelectric Heat Engines: Highly Efficient, Environmentally Friendly Cooling	$407,299
LANL-20110434DR	Correlations and Dynamics in Information Science	$716,901
LANL-20110435DR	Multi-scale Dynamics of Biological Systems	$539,709
LANL-20110437ER	Host-Mediated Adaptation of Influenza	$222,572
LANL-20110443ER	Staphylococcus Aureus Virulence Factor Interaction with Host Proteins (CFS)	$154,353
LANL-20110446ER	Towards Rapid Development of Immunomodulatory Drugs (CFS)	$124,972
LANL-20110449ER	A Comprehensive Study of Host-Influenza Virus (A/B) Interactions at the Single Host Cell Level (CFS)	$126,277
LANL-20110451ER	Analysis of Experimental Benchmarks (CFS)	$124,356
LANL-20110452ER	Neutron Reflectometry Determination of Fluid Properties at Salt Interfaces - Proof of Concept (CFS)	$122,310
LANL-20110456ER	Hyperspectral Satellite Instrument for Environmental Treaty Verification	$119,054
LANL-20110462ER	Compressive Sensing	$118,424
LANL-20110470ER	Solar Energetic Particles Entry and Trapping in the Magnetosphere: Filling a Major Space Weather Gap	$137,879
LANL-20110483ER	Non-Precious Metal Cathode Catalysts for Lithium-Air Batteries	$223,134
LANL-20110487ER	Combined Correlated NMR-Electromagnetic Spectroscopy and Imaging	$227,429
LANL-20110488ER	Multi-Source Energy Harvesting for Remote Power Applications	$240,821
LANL-20110508ER	Rational or Irrational Design A Synergistic Approach to Evolving an Industrially Important Enzyme	$223,595
LANL-20110510ER	Modeling Molecular Scale Natural Abundance Isotope Signatures For Chemical, Biochemical, and Nuclear (CBN) Threat Attribution	$128,850
LANL-20110511ER	delta-Pu Single Crystal Growth Capability for Advanced Electronic Structure Measurements	$253,073
LANL-20110512ER	Developing Proton Radiography for Fundamental Solidification Experiments	$147,153
LANL-20110515ER	Time-Resolved ARPES Studies of Strategic Materials	$347,768
LANL-20110516ER	Identifying, Creating, and Controlling Functional Hotspots in DNA	$136,915
LANL-20110517ER	Sample Receipt and Characterization of Unique Actinide Samples from LANL Environmental Sites	$180,498
LANL-20110519ER	Plant Growth Technology – Increasing Our Scientific Leadership Position and Our Impact	$243,794
LANL-20110523ER	Study of Small Thorium Heavy-Water Reactor Systems	$191,431
LANL-20110530ER	Exascale Sky (Cosmology)	$176,822

LANL-20110532ER	Mechanism of Inhibition of Acetylcholinesterase (U)	$203,449
LANL-20110533ER	Affinity Maturation and Specificity Broadening of Anti-influenza Antibodies Suitable for Therapy and Prophylaxis	$221,055
LANL-20110535ER	Mechanistic Studies Toward an Improved Carbonic Anhydrase for Biofuel Production.	$112,323
LANL-20110537ER	Exploiting Non-Innocent Ligands in Catalysis: New Base Metal Catalysts for the Reduction of Carbon Dioxide	$107,955
LANL-20110542PRD1	Mechanistic Investigation of C-C Bond Forming Reactions for the Production of Long Chain Hydrocarbons	$114,800
LANL-20110544PRD1	Auger-Recombination-Free Nanocrystals by Rational Design of Confinement Potential	$152,420
LANL-20110549PRD1	Exploiting the Fermi Surface to Understand Quantum Criticality in Complex Electronic Materials	$147,735
LANL-20110555ER	Searching for Low-Mass Dark Matter with the MAJORANA Low-Energy Physics Program	$32,416
LANL-20110556ER	Low-Frequency Acoustic Interferometry for Probing the Stratosphere.	$65,656
LANL-20110573ER	Development of an Interface-Dislocation Dynamics Model to Incorporate the Physics of Interfaces in Predicting the Macroscopic Mechanical Properties of Nanoscale Composites	$107,552
LANL-20110575PRD1	Optimization of Heterogeneous Sensing Systems for Risk-Minimized Decision Making	$12,359
LANL-20110580PRD2	Non-aqueous Organic Materials for Bio-defense	$88,202
LANL-20110581PRD2	Metal Catalysts for Oxidation of Lignocellulose and Reduction of Carbon Dioxide	$28,892
LANL-20110585ER	Synchrotron X-ray Laue Diffraction and Phase Contrast Imaging of Fe and Explosive Simulants under Shock Loading	$232,455
LANL-20110602ER	Microstructure Analysis for Extreme Events: A Stochastic Modeling Framework for Microstructure Datasets	$91,430
LANL-20110603ER	Coherence Effects in x-ray Diffraction Imaging	$333,085
LANL-20110605ER	Control of XFEL-Radiation Focusing through Electron-Beam Manipulation	$162,736
LANL-20110606PRD2	Aberration-corrected Transmission Electron Microscopy Study of Interfaces in Multilayered Composites	$55,245
LANL-20110614ER	Developing and Synthesizing Epitaxial Nanocomposites with Controlled Defect Landscapes and Desired Functionalities	$183,075
LANL-20110615ER	Three Dimensional Quantification of Metallic Microstructures in the Presence of Damage	$140,379

LANL-20110618ER	Fluid Flow Imaging of Alloy Melts and In-situ Fundamental Solidification Experiments at Temperature Extremes	$196,947
LANL-20110619ER	In-Situ Probing Monitoring of Microstructure Evolution During Annealing of Radiation Damage with High Energy Synchrotron Xray Diffraction	$232,022
LANL-20110627ER	Let the Data Choose the Signatures	$199,975
LANL-20110632ER	Achieving the Ultimate Spatial and Density Resolution of 800 MeV Proton Radiography	$208,701
LANL-20110633PRD2	Universal Physics with Ultracold Atoms	$23,072
LANL-20110640ER	How Trees Die: Signature Imaging to Unravel Carbon Starvation and Dehydration Dynamics in Vegetation During Drought	$201,867
LANL-20110645PRD2	Chemical Reactivity Signatures of Uranium Fluorides	$52,558
LANL-20110650ER	Learning New Things From Old Uranium Activation Data (U)	$236,182
LANL-20110663ER	Light Stable Isotope Signatures for Accelerator and Reactor Emissions	$208,111
LANL-20110665ER	Soil Microbial Signatures for Large-Scale Climate Change Field Experiments	$199,859
LANL-20110670ER	Signatures of Brain Functionality Detected using Direct Measurement of Blood Magnetic Susceptibility	$202,385
LANL-20110672ER	Hyperspectral Intensity Correlation Interferometry	$198,428
LANL-20110675ER	Chinese Economic Output from Satellite Data	$118,792
LANL-20110710DR	Optimization Principles for Co-Design applied to Molecular Dynamics	$312,595
LANL-20110711PRD2	Quantum simulations: From superconductivity to nanoscale electronics	$99,521
LANL-20110713ER	Superconducting Overhead Power Lines	$184,915
LANL-20110714ER	Assessing the Immunogenicity of Mosaic Hepatitis C Vaccines in a Mouse Model	$142,439
LANL-20110728ER	Low-Temperature Thermal Storage: A Renewable Carbon Neutral Technology	$204,213
LANL-20110732ER	Innovative Concepts for Highly-Efficient, On-Site Cogeneration	$250,013
LANL-20110733PRD2	Nano-spintronics: Spin Injection, Transport and Detection in One-dimensional Semiconductor Nanowires	$75,500
LANL-20110734DR	Accelerating Materials Certification	$1,078,355
LANL-20110735PRD2	A New Drift Shell Integration Technique for Inner Magnetospheric Space Weather Models	$87,900
LANL-20110736PRD2	Shortcuts to Adiabaticity in Quantum Devices	$11,557

LANL-20110737DR	CoCoMANS: Computational Co-design for Multi-scale Applications in the Natural Sciences	$452,796
LANL-20110745ER	Non-Invasive Imaging of Dense, Immobile Objects with Muon Tomography	$125,096
LANL-20110746ER	InfoFusion: "Connecting the Dots" Using Cyberspace Information Models	$109,013
LANL-20110747PRD3	"Listening" to the Noise of a Single Electron Spin: Ultra-sensitive, Non-perturbative Spin Noise Spectroscopy	$25,731
LANL-20110748PRD3	Probing the Structure of Superconducting States with Rotating Magnetic Fields	$30,245
LANL-20110749PRD3	Determining the Origin of the Highest Energy Cosmic Rays with TeV Gamma-Ray Observations	$32,564
LANL-20110751PRD3	Novel Laboratory and Field Observations to Model Climate Warming by Aged Absorbing Aerosols	$30,710
LANL-20119999ER	Post-project Debits and Credits	$7,188
	Total Cost for LANL: $138,258,729	
	Total # of Projects for LANL: 292	
	Administrative Cost Paid by Laboratory overhead	
LBNL - L. Berkeley National Lab		
LB09001	The Development of Reusable Software Modules for the Analyses of bioSAXS Data	$142,653
LB09007	Experimental Accelerator R and D Toward a Future Light Source at LBNL	$304,812
LB09009	Development of In Situ cells for Reactive Spectroscopic and Microscopic Studies	$135,209
LB09011	Dynamics of Homogeneous Catalysis Reactions Investigated with Transient Two-dimensional Infrared Spectroscopy	$105,916
LB09016	SPARKLE - A Fluorescence Energy Transfer (FRET) Methodology for Visualization of Simultaneous and Reversible Interactions	$359,491
LB09023	Identifying and Predicting Climate Change Impacts on the Land-Based Components of the Water Cycle	$173,387
LB09029rev	Tuning the Self-assembly of Membrane Proteins	$303,991
LB09030	X-Ray Optical Metrology for Coherence-Preserving Adaptive Optics	$206,950
LB09035	Uncovering the Mechanistic Basis for Soil Microbial Community Response to Altered Precipitation Patterns	$144,591
LB09036	High Quantum Yield Multi-alkali Cathodes for psec Pulsed Electron Sources	$355,015
LB10001	Enabling High Performance Computing (HPC) Workflows on Clouds	$178,643

LB10002	Direct Comb Spectroscopy and Atom Interferometry of Lithium	$139,544
LB10003	Heating Rates of Planar Ion Traps for Quantum Information	$166,257
LB10004	Physically-Based Accounting for Resource Use in New Energy Pathways	$105,994
LB10005	Bolometric Detectors for the Neutrinoless Double-Beta Decay Experiments	$203,323
LB10006	Metafluxomics of a Phosphorus Removing Microbial Community	$112,723
LB10007	Parallel Microfluidic Synthesizer: A Fully Automated Chemical Evolution Platform for Novel Materials Discovery	$138,051
LB10008	Heavy Element Mass Analyzer and Detector Capability	$181,130
LB10009	Long-range Ordering of Block Copolymers on Patterned Silicon	$169,718
LB10010	Predictive High-Throughput Assembly of Synthetic Biological Systems: From Gene Expression to Carbon Sequestration	$308,784
LB10011	Structure Solution of Inorganic Materials Using Energy Resolved Laue Microdiffraction.	$178,946
LB10012	Ion Beam Driven Fusion and Fusion-Fission Hybrids	$105,786
LB10013	Identification of Genetic Networks Controlling Susceptibility to Radiation-induced Carcinogenesis	$350,777
LB10014	The Nanoscale Surveyor	$176,846
LB10015	Multifunctional Window Coatings for High-Performance Buildings	$286,650
LB10016	Theoretical Studies of Dark Matter Beyond the Standard Model	$123,923
LB10017	CO2 as Cushion Gas for Compressed Air Energy Storage in Subsurface Reservoirs	$148,090
LB10018	Investigation of Image Current and Magnetic Field Tolerance Effects on High-Temperature Superconductor Undulators for Soft X-ray FELs	$201,367
LB10019	Engineering of Drought and Heat Tolerance in Bioenergy Crops.	$112,367
LB10021	Structured Charged Polymers	$168,533
LB10022	Biological Carbon Sequestration: Fundamental Research on Biological Carbon Capture and Soil Carbon Stabilization	$534,908
LB10023	Ambient Pressure Photoemission Spectromicroscopy	$145,829
LB10024	Linac Driver and Coherent Soft X-ray Sources	$737,759
LB10025	Integrated Optoelectronic Devices Based on Graphene	$137,407

LB10026	Test Monochromator/Spectrometer Systems with Prototype High Density Gratings for High Resolution X-ray Scattering	$213,942
LB10027	Double-Auger Emission of small Molecules following Core-Excitation and Ionization	$138,123
LB10028	Building Systems for Net Zero Energy Buildings	$238,832
LB10029	Computational Techniques for Non-crystalline X-ray Diffraction Imaging	$148,951
LB10030	Design and Surface Properties of Semiconductor Nanowires	$209,627
LB10031	Novel Accelerator and Engineering Strategies for Ion Beam Cancer Therapy	$165,479
LB10032	Plasma-assisted High Rate Deposition Concept for Energy Applications	$163,619
LB10033	Enhanced Subsurface Fluid Characterization Using Joint Hydrological and Geophysical Data Inversion	$179,015
LB10034	Search for a Permanent Electron Electric Dipole Moment (EDM)	$141,891
LB10035	Multinozzle Arrays for Single Cell Metabolomics	$170,848
LB10036	Surface-Selective Synthesis of Graphene Nanoribbons on Nanowire Templates	$171,308
LB10037	Investigating f-electron Exchange Coupling in Actinide and Lanthanide Complexes	$185,914
LB10039	Functional Characterization of NUCKS - a Potential Cancer Susceptibility Locus Required for Recombination	$74,744
LB10040	Synchrontron-Based Microtomography for Functional Analysis of Normal Tissue and Tumor Molecular Markers, and their Perturbation by Low Dose Radiation Exposure.	$87,702
LB10041	Cookstoves for Haiti	$73,875
LB10042	Advances in Standardized, Scar-less, Sequence-Independent Cloning Methods.	$165,994
LB10043	Gathering and Analysis of Worldwide Land Temperature Data	$104,818
LB10044	Toward a US Greenhouse Gas Information System (GHGIS)	$174,917
LB11001	Direct Determination of Electrostatic Interactions Through Advanced Analysis of High-resolution Macromolecular Crystal Data	$192,916
LB11002	Induced "Bucket Brigade" Photovoltaic Effect	$173,943
LB11003	Fiber System Development for Surveys of Baryon Acoustic Oscillations (BAO) Applicable to the Future BigBOSS Experiment	$133,758

LB11004	Scientific Tools in Multi-Dimensional X-Ray Spectroscopy and Coherent Diffractive Imaging	$406,932
LB11006	Development of Attosecond Synchronization for Future Light Sources	$129,555
LB11007	Effect of Secondary Mineral Coatings on Biogeochemical Processes	$263,728
LB11008	Fourth Generation Electron Cyclotron Resonance (ECR) Ion Sources	$126,543
LB11009	Assembly of Synthetic Organelles for Carbon Fixation	$123,983
LB11010	Lattice QCD Codes by Discretizing Time and Space	$300,202
LB11011rev	CYANOALKANES: Exploiting the Vast Diversity of Cyanobacterial Alkanes for Production of Biojetfuel	$398,947
LB11012	Real-Time Data Compression for High Speed Imaging X-Ray Detectors for the Next Generation Light Source	$197,733
LB11013	Attosecond XUV Condensed-Matter Science: Electronic Wavefunction Coherence and Correlated Dynamics	$210,712
LB11014	Ultrafast 2D Fourier-Transform Spectroscopy of Electronic Dynamics in Photovoltaic Nanomaterials	$158,138
LB11015	Identification and Analysis of Proteins That Regulate the Dynamic Response of Heterochromatin to Radiation	$167,833
LB11016	Determination of Impact of the Microenvironment and Tissue-level Self-organization on Cell Fate Decisions and Homeostasis in the Mammary Gland, to Ultimately Inform Drug Discovery	$193,701
LB11017	Piezoelectric Biomaterials for Novel Energy Conversion	$113,083
LB11018	Next Generation Computing for X-Ray Science	$242,260
LB11019	Probing the Partonic Structure of Protons and Nuclei with Isolated Direct Photons at the LHC	$227,402
LB11020	X-ray Fluorescence Tomography - 3D Elemental Mapping.	$164,845
LB11021	Developing Analytical and Communications Frameworks to Enable Breakthrough Low-carbon Technologies	$959,934
LB11022	Life-Cycle Analysis of Geologic Carbon Sequestration	$259,963
LB11023	Mapping Genes to Salty Acres: Engineering Salt-Tolerant Switchgrass Lines for Cost-Effective, Large-Scale Production of Sustainable Low-Carbon Biofuels	$254,758
LB11024	From Fossil Fuel to Photovoltaics: Economic, Environmental, and Health Impacts for Policy Considerations	$294,858
LB11025	The Lyman Alpha Forest Cosmology Simulator	$205,926
LB11026	Probing and Controlling Spin and Charge in Strong Spin-Orbit Materials	$170,442

LB11027	Accelerated Materials Design through First-Principles Calculations and Data Mining	$158,972
LB11028	Development of Variable-polarization Superconducting Undulators for Soft X-ray FEL Radiators	$193,289
LB11029	Development of a Colorimeter for the Measurement of Image-current Heating on Wakefield-surfaces for High-performance Undulator Applications	$150,295
LB11030	Highly Parallelized, Low-cost Synthesis of Microbial Genes Using High-density Oligonucleotide Arrays	$125,432
LB11032	Dynamic Light Redirection by Optical Metamaterial Coatings	$364,817
LB11033	Applying Anomalous X-ray Solution Scattering to Biological Macromolecules at the Next Generation Light Source	$186,422
LB11034	Testing a New Carbon Sequestration Strategy by Accelerating Calcite Precipitation in Soils	$177,944
LB11035	Experimental Realization of a High-harmonics-seeded, Laser-plasma-accelerator Driven Free-electron Laser	$314,739
LB11036	Transcriptome Analysis of Agave, a Candidate Biofuel Feedstock for Semi-Arid Climates	$159,352
LB11037	Engineering Yeast to Produce Methyl Formate for Conversion to Fuels and Chemicals	$77,221
LB11038	High Voltage Up- and Down-converters for Low Power Low Density Detector Instrumentation	$223,714
LB11039	Soft X-ray Spectroscopy of Lithium and Conductive Polymers for Li-Ion Batteries	$162,846
LB11040	Imaging Through Liquids using a TEM	$487,094
LB11041	Collaboration with China on Geologic Carbon Sequestration: Novel Field Tests to Characterize Heterogeneity for China's First Pilot Test	$174,571
LB11042	Feasibility and Development of Fluctuation X-ray Scattering at the NGLS	$271,126
LB11043	Defining an Ecosystem to Support Data-Intensive Science	$299,818
LB11044	Interactions among Cloud Processes, Convection, and Climate Change	$269,962
LB11045	Modeling Desert Soil Crust Microbial Community Response to Pulsed Climate Events	$281,863
LB11046	Intermediate Band Solar Cell - Proof of Concept and Search for New Materials	$64,739
	Total Cost for LBNL: $20,371,280	
	Total # of Projects for LBNL: 96	
	Administrative Cost Paid by Laboratory overhead	

LLNL - L. Livermore National Lab		
08-ERD-031	Efficient Numerical Algorithms for Vlasov Simulation of Laser-Plasma Interactions	$129,540
08-ERD-062	Mesoscale Studies of Hydrodynamic Instability Growth in the Presence of Electric and Magnetic Fields	$93,390
08-ERD-064	Hybridization, Regeneration, and Selective Release of DNA Microarrays	$122,290
08-ERD-065	Coordinated Analysis of Geographic Indicators for Nuclear-Forensic Route Attribution	$93,280
08-ERD-069	Study of Kelvin-Helmholtz Instability in High-Energy-Density Hydrodynamic Processes	$87,290
09-ERD-002	Nanosecond Characterization of Dynamic Void Evolution in Porous Materials	$396,280
09-ERD-003	Understanding the Surface Properties that Lead to Optical Degradation in High-Fluence, High-Average-Power Optical Materials	$1,018,350
09-ERD-004	Improved Spectral Line-Shape Models for Opacity Calculations	$338,400
09-ERD-005	Multiresolution Adaptive Monte Carlo for Microstructure Simulations	$243,150
09-ERD-009	Coupling Advanced Cryo-Electron Microscopy with High-Performance Computing to Resolve Biomolecular Function	$494,230
09-ERD-012	First-Principles Planetary Science	$209,770
09-ERD-014	Quantitative Analysis of Vector Field Topology	$361,280
09-ERD-016	Imaging X-Ray Line-Shape Diagnostic for Burning Plasmas	$334,350
09-ERD-017	Rapid Exploitation and Analysis of Documents	$350,900
09-ERD-019	Adding Validation and Novel Multiphysics Capabilities to the First-Principles Molecular Dynamics Qbox Code	$190,270
09-ERD-020	How Carbon and Oxygen Can Be Made in Stars: An Ab Initio Approach to Nuclear Reactions	$153,020
09-ERD-021	Role Discovery in Dynamic Semantic Graphs	$448,190
09-ERD-023	Ultrafast Nanoscale Dynamic Imaging Using X-Ray Free Electron Lasers	$276,850
09-ERD-025	Scrape-Off-Layer Flow Studies in Tokamaks	$314,440
09-ERD-026	Collection of Refractory Debris from the National Ignition Facility for Stewardship-Relevant Measurements	$306,150
09-ERD-029	Enabling Transparent Ceramics Optics and Advanced Armor with Nanostructured Materials Tailored in Three Dimensions	$310,960

09-ERD-030	Critical Enabling Issues for Burning-Plasma Diagnostics	$178,780
09-ERD-032	Experimental Determination of Dense Plasma Effects on Bound States in Extreme States of Matter	$492,060
09-ERD-034	Modern Finite Elements for Lagrangian Hydrodynamics	$556,640
09-ERD-036	Uses of Ignition at the National Ignition Facility	$277,840
09-ERD-037	Shock Temperatures from Neutron Resonance Spectroscopy	$215,560
09-ERD-038	Improving Atmospheric Flow Prediction at Intermediate Scales	$283,340
09-ERD-042	Arc Initiation of High Explosives	$301,270
09-ERD-044	Lagrange Multiplier Embedded-Mesh Method	$448,850
09-ERD-045	Optimized Volumetric Scanning for X-Ray Area Sources	$112,480
09-ERD-049	Magnetorheological Finishing for Large-Aperture High-Fluence Optical Applications	$1,051,090
09-ERD-050	Characterization of Tritium Uptake and Release by Inertial-Confinement Fusion Reactor Materials	$1,130,250
09-ERD-051	Methods for Mitigation of Damage to Multilayer Mirrors	$1,104,930
09-ERD-054	Flexible and Rapid Therapeutic Countermeasures for Global Biosecurity	$1,755,720
09-ERD-057	Maskless, Low-Cost, High-Performance Polymer Waveguides	$67,980
09-ERI-002	Biological Testing of Systems Biology: Validation of Flux-Balance Analysis Predictions	$247,950
09-ERI-003	Mapping Patterns of Past Drought in California: Late-Holocene Lake Sediments as Model Diagnostics	$217,400
09-ERI-004	Stardust Science: Nanoscale Analytical Studies of Materials	$378,630
09-LW-003	Superimposed Plasmonic and Photonic Detection Platform	$183,020
09-LW-036	The Role of Dendritic Cells in Tularemia Pathogenesis	$313,700
09-LW-044	An Atomic Inner-Shell X-Ray Laser Pumped by the Linac Coherent Light Source	$147,710
09-LW-077	Versatile Delivery and Immune-Stimulatory Platform for Just-in-Time Vaccine Development	$300,980
09-SI-003	Radiation-Tolerant Materials	$2,049,000
09-SI-004	Precision Monoenergetic Gamma-Ray Science for NNSA Missions	$5,866,250
09-SI-005	Physics and Chemistry of the Interiors of Large Planets: A New Generation of Condensed Matter	$3,139,720
09-SI-010	From Super-Earths to Nucleosynthesis: Probing Extreme High-Energy-Density States of Matter with X-Rays	$2,180,800
09-SI-011	The Microphysics of Burning, Hot Dense Radioactive Plasmas	$2,217,510

09-SI-013	Supercomputing-Enabled Transformational Analytics Capability (SETAC)	$2,962,100
10-ERD-004	Mix at the Atomic Scale	$885,700
10-ERD-020	Genomics of Cell-Cell Communication: Identification of DNA Sensors in Humans	$513,790
10-ERD-021	Microbes and Minerals: Imaging Carbon Stabilization	$525,590
10-ERD-025	Parallel Discrete-Event Simulation of Cyber Attack and Defense Scenarios and Automated Rollback Code Generation	$696,870
10-ERD-026	High-Gradient Inverse Free-Electron Laser Accelerator	$482,510
10-ERD-027	CgWind: A Parallel, High-Order Accurate Simulation Tool for Wind Turbines and Wind Farms	$541,630
10-ERD-029	Modeling and Measuring Quark-Gluon Plasma Shock Waves	$225,720
10-ERD-033	Unlocking the Universe with High-Performance Computing	$412,390
10-ERD-035	Design of Novel Catalysts to Capture Carbon Dioxide	$641,430
10-ERD-038	Discovery and Synthesis of Materials for High-Energy-Density Science	$256,510
10-ERD-039	Binary Analysis	$472,110
10-ERD-040	Uncertainty Visualization	$381,100
10-ERD-041	M3Net: Taxonomy Construction and Topic Mapping for Multimedia Message Manager Traffic	$501,780
10-ERD-043	Embedded Sensors for Monitoring Complex Systems	$829,910
10-ERD-044	An Intense Laser-Based Positron Source	$471,130
10-ERD-053	Direct Observation of Phase Transformations and Twinning Under Extreme Conditions: In Situ Measurements at the Crystal Scale	$604,500
10-ERD-054	Eigensolvers for Large-Scale Graph Problems	$653,930
10-ERD-055	Prediction of Underground Coal Gasification Cavity Growth, Coal Conversion, and Geophysical Signatures	$920,430
10-ERD-056	Material-Coolant Interactions in Fusion Reactors	$910,640
10-ERD-057	Multiscale Polymer Flows and Drag Reduction	$326,370
10-ERD-058	Fundamental Research in Advanced Quantum Simulation Algorithms	$358,230
10-ERD-059	Thermodynamic and Kinetic Modeling of Advanced Nuclear Fuels	$1,191,730
10-ERD-060	Enhancing Climate Model Diagnosis and Intercomparison	$500,770
10-FS-002	Feasibility of a Hybrid Rubidium Resonance and Exciplex Pump Laser	$56,350
10-LW-002	Development of High-Performance Lead-Free Solders for Microelectronics and Semiconductor Applications	$46,840

10-LW-020	Understanding the Role of Virus Evolution in Interspecies Transmission Events	$300,740
10-LW-033	Establishing Cancer Stem Cell Longevity and Metastatic Potential	$288,820
10-LW-041	Radiation Biodosimetry Using Loop-Mediated Isothermal Amplification	$244,150
10-LW-045	In Situ Spectroscopy and Microscopy for the Study of Advanced Materials for Energy Storage	$290,530
10-SI-006	Science and Technology of Unconventional Fiber Waveguides for Emerging Laser Missions	$1,651,360
10-SI-007	Real-Time Space Situational Awareness	$3,323,930
10-SI-009	Dynamic Chamber Processes for LIFE: Simulations and Experiments on Beam Propagation and Chamber Clearing	$1,885,470
10-SI-010	Compact, Efficient Lasers for Inertial Fusion-Fission Energy	$2,375,670
10-SI-013	The Advance of Uncertainty Quantification Science	$2,612,060
10-SI-014	ExaCT: Exascale Computing Technologies	$1,693,240
10-SI-015	Advanced Rare Event Detectors for Nuclear Science and Security	$1,815,250
10-SI-016	Nuclear Forensics: An Integrated Approach for Rapid Response	$2,079,260
11-ERD-006	Detection and Attribution of Regional Climate Change with a Focus on the Precursors of Droughts	$261,070
11-ERD-008	Unifying Memory and Storage with Persistent Random-Access Hardware	$385,700
11-ERD-011	Fundamental Chemical Behavior of Superheavy Elements through Applications of Online Isotope Production and Automated Chemical Systems	$491,260
11-ERD-012	A Rapid Response System for Toxin Removal	$387,670
11-ERD-015	Coherence-Preserving X-Ray Adaptive Optics	$527,560
11-ERD-016	Innate Immunity for Biodefense: Targeted Immune-Modulation to Counter Emerging Threats	$1,027,920
11-ERD-017	Advanced Algorithm Technology for Exascale Multiphysics Simulation	$1,141,270
11-ERD-022	Compressive Sensing for Wide-Area Surveillance	$399,210
11-ERD-023	Modeling of Microstructural Processes in Tungsten-based Alloys for Fusion Applications	$452,200
11-ERD-026	Chemical-Vapor-Modified Laser-Based Damage Mitigation and Surface Shaping of Fused Silica	$2,131,870
11-ERD-027	Unraveling of Assembly and Structure-Function Relationships of Poxviruses	$212,280

11-ERD-028	Data Abstractions for Portable High-Performance Computing	$388,350
11-ERD-030	Understanding the Stochastic Nature of Laser-Induced Damage	$1,992,540
11-ERD-033	Temperature Dependent Lattice Dynamics and Stabilization of High-Temperature Phases From First-Principles Theory	$459,470
11-ERD-035	Adaptive Sampling Theory for Very-High-Throughput Data Streams	$210,790
11-ERD-036	Fundamentals of Figure Control and Fracture-Free Finishing for High-Aspect-Ratio Laser Optics	$1,931,660
11-ERD-037	Rapid Development and Generation of Affinity Reagents for Emerging Host-Pathogen Interactions	$511,730
11-ERD-039	Hydrogen Melting and Metallization at High Density	$405,220
11-ERD-044	Quantification of Carbon 14 by Optical Spectrometry	$488,490
11-ERD-046	Pressure-Induced Melt, Nucleation, and Growth: Fundamental Science and Novel Technological Materials	$243,360
11-ERD-048	Images and Spectra of Extrasolar Planets from Advanced Adaptive Optics	$599,280
11-ERD-050	Dynamics of Ultrafast Heated Matter	$497,820
11-ERD-051	Development of an Approach to Imaging for use in a Verification Regime	$449,010
11-ERD-052	Ultrafast, Sensitive Optical Radiation Gamma, Neutron, and Proton Detector Development	$799,510
11-ERD-053	Land-Use Impacts on Belowground Carbon Turnover and Ecosystem Carbon Dioxide Source Attribution Using Radiocarbon	$430,340
11-ERD-054	Astrophysical Collision-Less Shock Generation by Laser-Driven Laboratory Experiments	$222,590
11-ERD-058	Control of Impulsive Heat Loads in Tokamaks: Measurements and Modeling	$603,920
11-ERD-060	Targeted Drug Delivery for Treating Traumatic Bone Injury	$532,820
11-ERD-061	Resonantly Detected Photo-Acoustic Raman Spectroscopy as a New Analytical Method and Micro-Volume Probe	$274,590
11-ERD-063	Investigation of Fast Z-Pinches for Scalable, Large-Current High-Gradient Particle Accelerators	$652,530
11-ERD-066	Accelerator and Secondary-Ion Mass Spectrometry for Analysis of Coastal Carbon Flux	$405,440
11-ERD-067	Detonation Performance of Improvised Explosives via Reactive Flow Simulations and Diamond Anvil Experiments	$354,730

11-ERD-069	Nuclear Plasma Physics	$538,640
11-ERD-073	Ab Initio Study of the Water-Semiconductor Interface for Photo-Electrochemical Hydrogen Production	$319,930
11-ERD-075	The Role of Plasma Electromagnetic fields in Anomalous Mass Diffusion: Applications to High-Energy-Density Science	$209,660
11-ERD-076	Large Scale Energy System Models: Optimization Under Uncertainty	$346,780
11-FS-005	Next-Generation Tunable Targets for Laser-Compression Experiments	$3,730
11-FS-007	Dynamics of the Eagle Nebula	$4,570
11-FS-008	Relativistic Plasma Physics at the National Ignition Facility	$10,850
11-FS-010	The Feasibility of Using Aerosols to Discriminate and Quantify Greenhouse Gas (GHG) Emissions by Source	$101,630
11-FS-014	Demonstrating precision delayed-neutron spectroscopy using trapped radioactive ions	$51,500
11-FS-015	Feasibility of Asteroid Deflection Investigations	$73,180
11-LW-003	Structure-Property Relationships in Ferropnictide Superconductors at Extreme Pressures	$292,500
11-LW-008	Demonstration of Electron Spin Imbalance in Two-Dimensional States	$295,810
11-LW-009	Computational Studies of Blast-Induced Traumatic Brain Injury Using High-Fidelity Models	$197,470
11-LW-015	In Vivo Modulation of MicroRNA for Cancer Therapy	$300,900
11-LW-018	Prenatal Exposure to Endocrine-Disrupting Compounds Found in the Water Supply	$257,430
11-LW-019	Development of an Economically Viable Biological-Hydrogen Production System	$289,760
11-LW-028	Fundamental Properties of Diamondoids	$280,100
11-LW-037	Mass Transport through Porous Materials	$298,070
11-LW-039	Protist Power: Deconstructing Termite Conversion of Wood to Biofuels	$229,730
11-LW-042	Non-Acoustic Secure Speaker Verification in High-Noise Environments	$251,020
11-LW-054	Solar-Powered Microbial Electrolysis Cells for Hydrogen Production	$283,860
11-SI-002	Advanced Inertial-Fusion Target Designs and Experiments for Transformative Energy Applications	$1,574,310
11-SI-004	Target Components for Ensuring Survival During Flight into a Laser Inertial-Fusion Reaction Chamber	$1,348,530
11-SI-005	Scalable High-Volume Micro-Manufacturing Techniques for Three-Dimensional Mesoscale Components	$2,342,950

11-SI-006	Creating Optimal Fracture Network	$422,480
	Total Cost for LLNL: $96,619,970	
	Total # of Projects for LLNL: 142	
	Administrative Cost Paid by Laboratory overhead	
NREL - National Renewable Energy Lab		
6001010	LDRD Closed Project Costs	$10,704
6001099	LDRD Peer Review Costs	$10,050
6270803	Catalyst Improvement for Solar Biohydrogen Production	$102,546
6270901	Biodiesel from Cyanobacteria	$184,596
6271001	Mapping Local Photocutrent in Excitonic Solar Cells with Nanometer Resolution	$162,972
6271101	Algae Constitutively Expressing a Novel Lipid-Producing Pathway	$216,848
6501101	Wind Turbine Array Fluid Dynamic and Aero-Elastic Simulations	$314,385
6510901	Use of Digital Gene Expression: TAG Profiling for High Throughput Transcriptomics in Microbial Strains Involved in Advanced Biofuel Production	$238,575
6511001	Regulated Enzymatic Disruption of Algal Cell Walls for Enhanced Lipid Recovery	$222,860
6511002	Identification of Novel Promoters to Facilitate Genetic Engineering of Algae for Enhanced Oil Production	$197,239
6511003	Comprehensive Pyrolysis Oil and Pyrolysis Oil-Based Fuels Characterization Using 2-Dimensional GC/GC/MS	$309,594
6511101	Computational and Experimental Design of Catalysts for Lignin Depolymerization	$259,255
6511102	Developing Compositional Analysis Methods to Compare Microalgae-to-Biofuel Processes	$255,913
6511103	Two-Component Signal Systems Involved in Algal Nitrogen Assimilation and the Potential for Increased Lipid Production	$48,659
6511104	Production of Hydrocarbon-Based Biofuels by Direct Microbial Conversion of Lignocellulosic Biomass Trichoderma reesei	$42,391
6511105	Acid-Functionalized, Magnetic Nanoparticles as Quasi-Homogeneous, Recyclable Catalysts for Algal Cell Disruption	$37,793
6521001	Searching for Low-Cost, Stable and Multiple Electron Transfer Electrodes for Li-Ion Batteries by a Combination of Theoretical Study, Synthesis, and Material Characterization	$295,700
6521002	Advanced Thermal Materials for CSP	$271,934

6521003	A Fundamental Study of Novel, Incoherent Light, Upconversion Materials for Application in Third-Generation Photoconversion Devices	$246,858
6521101	In-Line Sensing to Monitor CdS Thin-Film Growth in Roll-to-Roll Manufacturing	$157,206
6540901	Nano-scale Control of Thermal Transport in Novel Materials/Nanostructures	$103,683
6541001	Improving Performance of Lithium-Ion Batteries using Advanced Coating Technologies	$296,017
6541101	Properties and Performance of Next Generation Biofuels	$346,330
6541102	Improving Performance of Lithium-Ion Batteries using Nano-Structured Electrodes	$214,845
6541103	Development of Particulate Size and Count Apparatus to Support Renewable Fuel Technologies	$39,985
6551001	Smart Grid Modeling and Hardware-in-Loop Validation	$216,808
6551101	Building Occupant Agent	$162,388
6551102	Advanced Sensoring and Metering Devices for Electrical/Electronic Loads	$238,279
6560901	Novel Support and Innovative Structured, Low Loading Catalyst Layer for PEM Fuel Cells	$197,716
6561101	Synthesis and Modeling of Shape-Anisotropic Nanomaterials using Spontaneous Galvanic Displacement Reactions	$210,136
6590901	Solid-State Proton Conductor for a Hydrogen Battery	$201,025
6590902	Simulation Strategies for Organic, Excitonic and Third-Generation Solar Cells	$198,242
6591001	Development of Short Wavelength GaInP for Solid-State Lighting Applications	$300,208
6591002	Design Graphene Oxide Based Low Band Gap Absorber for OPV Applications	$263,053
6591101	The Influence of Surface Plasmons on Excited State Evolution in Light Harvesting Chromophores	$224,167
6591102	Synthesis of Uniform Graphene Based Materials with Controlled Electronic Structure for Catalyst and Photovoltaic Applications	$199,672
6591103	Ionic Liquid Electrodeposition Process of Cu-Sn-Zn-S-Se Thin Films for Solar Cells	$226,626
6641101	Assessing the Effects of Climate Change on Electricity Generation	$137,986
6641102	Quantifying the Potential for Interruptible Load Capacity to Assist in Integration of Variable-Resource Renewable Generation Technologies	$48,620

06RF1001	Development of Novel Cyanobacterial Biofuels	$440,055
06RF1002	Understanding the Properties of Intrinsic and Photo-Induced Charges in Molecular-Based Materials: Advancing Excitonic Solar Cells	$393,114
06RF1003	Expanding TCO Properties by Band Gap Engineering	$189,696
06RF1101	Unique Crystalline Phase of Small Bandgap Si for Low Cost Thin Si PV Cells with Enhanced Conversion Efficiency through Multiple Exciton Generation (MEG)	$151,588
06RF1102	Development of New Theoretical Methods for Searching Optimized Materials for Solar Conversion	$122,460
	Total Cost for NREL: $8,708,777	
	Total # of Projects for NREL: 44	
	Total Administrative Cost $195,984	
NTS - Nevada Test Site		
H1701090	Debye-Waller Dynamic Temperature Diagnostic	$2,565
H1701190	Single Shot Detection of Phase Transitions Using THz Spectroscopy	$2,268
H1702060	SPECTR-Spectroscopic Proof of Concealed Explosives by THz Spectroscopy	$766
H1702080	Radiation Hardened Wide-gap Semiconductor Detectors	$12,837
H1702180	Dark Field, Phase Contrast Radiography	$1,070
H1702220	Thermal Neutron Imager	$40,556
H1703090	Advanced PDV Techniques: Evaluation of Photonic Technologies	$233
H1704030	Straw Detector-Dual Fission Meter for Gamma-Neutron Multiplicity Measurement	$1,467
H1704080	Laser Polar Nepholometer for Aerosol Studies	$2,125
H1705060	Fourier Transform Pyrometry	$14,404
H1705090	Coded Apeture Thermal Neutron Imaging/Directional Detector	$19,807
H1705110	Multi-layer Hybrid Colloidal Quantum Dot AlGaN-based Photodetectors	$34,688
H1705260	Passive 802.11b Geo-location using a 4-element Antenna Array	$3
H1705380	Density Functional Theory Computations for Uranium Chemistry	$212
H1705460	Enhanced Methods of Object Recognition and Classification within a Scene	$945
H1705470	Search Device	$93
H1706070	Measurement of Tagged Neutron Fission Anisotropy	$12
H1706330	Deterministic Transport for Quantification of AMS Data Products	$3,327

H170FS30	VOC Detection from Biofermentation Processes	$27
J1701131	Back-Thinned Silicon Radiation Detector Readout	$298,776
J1701171	RITS non-invasive energy / angle diagnostic	$120,173
J1701181	Nanoscale Properties of Shocked Materials	$265,339
J1701191	Ultrafast Electron Diffraction for Shock Physics Phase Transition Studies	$338,439
J1701251	Monte Carlo Modeling of Porous Silicon Neutron Detectors	$161,367
J1701261	Spiral thermal neutron detector	$310,490
J1701301	Compact Accelerator with Integral, Coaxially Coupled RF Power	$183,196
J1701321	Passive Imaging of Warhead-like Configurations with Cosmic-Ray Muon Tracking Scanners	$316,948
J1701331	Advanced high-speed 16-bit digitizer system	$212,007
J1702101	Radiation Hardened Semiconductor Detectors and Detector Arrays	$292,985
J1702131	Ultrafast Mach-Zenders with Chromophore Polymers	$251,795
J1702S11	Lightweight High Efficiency Thermal Neutron Detector	$45,468
J1703071	Cerenkov Non-Intercepting Beam Monitor (CNIBM) for Relativistic, Charged Particles	$89,545
J1704031	Straw Detector - Dual Fission Meter for Gamma - Neutron multiplicity Measurements	$226,258
J1704181	Laser Polar Nephelometer for Aerosol Studies	$159,666
J1705021	Photonic bandgap crystals for optical tagging, tracking and locating	$111,639
J1705081	Three Dimensional Nanoparticle Enhancement of Scintillation	$97,977
J1705141	Improved understanding of windows for optical shock-wave diagnostics, Phase II	$235,669
J1705161	In-situ Shock-Anvil Thermometry	$230,184
J1705171	Miniaturizing Time-of-Flight Mass Spectrometers	$188,119
J1705291	Time-resolved Hyperspectral Fluorescence Spectroscopy using Frequency Modulated Excitation	$248,342
J1705311	Time multiplexed emissivity and pyrometry	$272,030
J1705331	Enhanced Methods of Object Recognition and Classification within a Scene	$312,342
J1705581	Nanoparticle-based Analytical Biosensor	$195,979
J1706071	Delayed Radiation Measurements using the Dense Plasma Focus	$213,847
J1706081	Nanostructured Nuclear Radiation Detector	$225,658
J1706411	Application of a MLE, Kalman Filtering, and Transport Calculations to Contouring of Radiological Measurements	$23,359

	Total Cost for NTS: $5,725,018	
	Total # of Projects for NTS: 46	
	Total Administrative Cost $882,677	
ORNL - Oak Ridge National Lab		
5195	Controlled Hierarchical Self-Assembly of Robust Organic Architectures	$64,893
5201	Development of Novel Biocatalysts for the Production of Fuels and Chemicals from Synthesis Gas	$62,986
5212	Uncertainty Assessment and Reduction for Climate Extremes and Climate Change Impacts	$29,279
5221	A Systems Biology Approach to Study Metabolic and Energetic Interdependencies in the -i-Ignicoccus-Nanoarchaeum-/i- System	$50,660
5227	Fundamental Neutron Scattering Studies of the Molecular Mobility and Interactions between Natural Porous Media and Greenhouse Gases	$47,599
5228	Integrated Navigation System for GPS-Denied Environments	$299,919
5238	Spatiotemporal Data Mining Framework for Monitoring Biomass at Regional and Global Scales	$23,404
5246	Neutron Scattering and Osmotic Stress to Study Intrinsically Disordered Proteins	$46,548
525	A Nonlinear Plasmonic Nano-Circuit for Data Communications	$29,962
5256	Developing a Systems Biology Approach for Linking Genetic and Environmental Constraints to Primary Productivity in Model and Nonmodel Species	$47,879
5282	High-Throughput Computational Screening Approach for Systems Medicine	$54,310
5342	New Density Functionals for Ab Initio Calculations Derived from Many-Body Theory	$50,006
5384	Scalable, fully implicit algorithms for first-principles kinetic simulations at the ultrascale	$300,517
5387	Soft-Error Resilience for Future-Generation High-Performance Computing Systems	$326,018
5388	Multiphase Self-Organized Interfaces for Polymer Photovoltaic Technologies	$503,461
5404	Asynchronous In-Situ Neutron Scattering Measurement of -10--s Transient Phenomena at Spallation Neutron Source	$301,213
5410	Massively Parallel Algorithms for Scalable Exascale Data Analysis	$354,576

5413	Wavelength-Division Multiplexed Quantum Communication Network	$377,305
5423	New Multinary Materials for Solar Energy Utilization	$299,900
5424	Revolutionary Radiation Transport for Next-Generation Predictive Multi-Physics Modeling and Simulation	$399,196
5428	Tough electrolytes for batteries - Composites inspired by nature	$441,311
5429	DRTI: Data-Integration and Runtime Infrastructures for Discrete Event Execution at Peta-Scale and Beyond	$354,990
5432	The Search for Common Themes in Unconventional Superconductivity: Spin Excitations in Organic Superconductors	$334,871
5437	Standoff Detection and Imaging of Chemicals	$323,885
5445	In-situ Neutron scattering studies of Fuel Cell materials	$319,797
5451	Designing high efficiency photovoltaic heterostructures by interfacing polar and nonpolar oxides at the atomic scale	$274,317
5469	The Eastern U.S. as a test-bed for Smart Grid technologies: a virtual power system enabled by ultra-scale computing	$449,166
5470	MEMS based pyroelectric thermal energy scavengers and coolers	$335,074
5477	Cyber Defensive Countermeasures	$423,488
5481	Novel Zeolitic Carbon Support for Catalytic Bioethanol Production	$134,235
5483	Development and Verification of Multi-Scale, Multi-Physics Models to Enable the Design of Safe Rechargeable Batteries	$99,504
5484	Novel Nanostructured Photovoltaic Solar Cells	$325,117
5487	Biological Signature Identification and Threat Evaluation System (BioSITES)	$390,978
5501	Enabling plant systems biology investigations for carbon cycling and biosequestration research	$228,541
5506	Achieving Rechargeable Li-Air Batteries through Metal Oxide Electrocatalysts	$469,572
5511	Addressing fundamental challenges in modeling the recrystallization of metallic polycrystals through in-situ neutron diffraction studies	$245,818
5512	Low Cost Materials & Manufacturing of CIGS Thin Film Solar Cells	$199,369
5528	Enhancing Climate Impact Integrated Assessment for Water Through Climate Informatics	$142,231

5531	Plasma Heating to Enable Fusion Energy Plasma Material Interface Research	$349,294
5547	A Transformational, High Energy Density Secondary Aluminum Ion Battery	$349,877
5548	Catalytic Conversion of Lignin Feedstocks for Bioenergy Applications	$111,727
5550	Computational Biology Toolbox for Ultrascale Computing	$299,648
5551	Neutron Imaging of Fluids Within Plant-Soil-Groundwater Systems	$176,927
5556	Highly Efficient Refrigeration Systems Based on Advanced Magnetocaloric Materials	$393,177
5557	Decision Support for Secure and Sustainable Bioenergy System	$301,388
5561	Evaluating the Role of Cloud Computing for Scientific Discovery	$355,396
5565	Engineered Chemical Nanomanufacturing of Quantum Dot Nanocrystals -- Meeting the Energy Technology Demands	$100,015
5566	Predictive System Simulation Capability for Evaluating Safety and Performance of Batteries	$466,430
5567	Protein Dynamics: Neutron Scattering Methodological Development	$92,322
5570	Development of a High Magnetic Field Helicon Plasma Source for Fusion Energy Materials and Component Tests	$234,920
5573	Rapid Radiochemistry Applications in Nuclear Forensics	$99,730
5593	Power Flow Control Using Distributed Saturable Reactors	$299,358
5594	Direct catalytic conversion of ethanol to hydrocarbons - a first principles theoretical and experimental study	$229,174
5599	Portable Water Reclamation from Diesel Exhaust by Inorganic Membranes	$320,428
5604	Novel Resistive Plate Avalanche Chamber for Neutron Detection	$278,848
5606	Characterization and Modeling of Permafrost Microbial Community Diversity and Metabolism during Simulated Global Warming	$333,494
5608	Fundamentals of ionic conductivity in polymeric materials for energy storage applications: How to decouple ionic motions from segmental dynamics	$344,563
5623	Functionally Graded and Geometrically Ordered Titanium Composite Armor Materials	$324,949

5630	Scalable and Efficient Infrastructure for Exascale Analysis and Visualization	$249,973
5641	Advanced Bioprocessing for Sustainable Biorefinery Technology Development	$362,231
5653	Ultrascale Algorithms for Verifying Security Properties of Compiled Software	$298,403
5659	Real-Time Simulation of Power Grid Disruptions	$390,864
5663	Nanoporous Inorganic Membranes for Selective Separations in High Temperature Flow-through Recycle Pretreatment of Lignocellulosic Biomass	$309,047
5665	"Distributed-Computational-Framework-for-Massive-Heterogeneous-Data- Fusion "	$341,484
5684	Towards full first-principles simulations of correlated electron materials	$298,997
5685	Modeling Long-term Population Resettlement under Climate Change Scenarios	$250,486
5698	Quantum Lightwave Circuits	$249,995
5699	Incorporating Molecular-Scale Mechanisms Stabilizing Soil Organic Carbon into Terrestrial Carbon Cycle Models	$265,600
5714	Advanced Alloy Development for the Next Generation Liquid Fluoride Salt Cooled Nuclear Reactors	$398,477
5716	Why coatings work: Nanoscale view of high voltage cathode surfaces	$290,448
5740	Material Degradation Phenomena and Mitigation For Nuclear Energy Systems	$299,575
5749	Hercules: A User Guided Translation Tool to Facilitate Application Porting to New Peta/Exascale Architectures	$349,999
5767	Study of Gas Phase Separations for Closed and Modified Open Used Nuclear Fuel Reprocessing	$296,719
5768	A Predictive Analysis Toolbox for Ultrascale Data Exploration	$340,152
5770	Quantum Imaging by Compressive Sampling for Enhanced Surveillance and Real Time Monitoring	$273,235
5777	Enhanced Directionally Selective Moderator for SNS	$313,493
5801	Unraveling the molecular and biochemical basis of crassulacean acid metabolism (CAM) in Agave for sustainable biofuel production	$296,641
5833	Harnessing Nitrogen and Sulfur Cycles to Develop Microbial Consortia for Consolidated Bioprocessing	$322,426
5836	Femtosecond Electronic Spectroscopy of Complex Nanostructures and their Functional Assemblies	$372,915

5837	Cryogenic Development for a Measurement of the Neutron Electric Dipole Moment at the Spallation Neutron Source	$302,414
5839	Motional Changes in Biomolecular Complexation	$92,458
5840	Closing Technology Gaps with the Development of Advanced Fusion Experimental Facilities	$383,057
5842	Highly-Polar Oxides for Photovoltaics Beyond p-n Junctions	$182,361
5843	Theoretical Studies of Decoupling Phenomena in Dynamics of Soft Materials	$145,917
5850	Liquid-Medium Position-Sensitive Thermal-Neutron Ionization Chamber	$3,965
5851	Solar Wind Heavy Ion Sputtering of Lunar Regolith	$70,044
5854	Hydrogel-Encapsulated Solids for In Vitro Contaminant Availability Testing During Ingestion By Large Vertebrates	$9,609
5856	Spin Excitations and Multiferroic State of Doped CuFeO2	$62,699
5859	Multi-Modal Biometric Recognition of Non-Cooperative Subjects at a Distance	$94,712
5860	PAMAM Dendrimers with Regularly Alternating Functionalization as Potential Carriers for Imaging and Therapeutic Agents for Biomedical Applications	$39,997
5861	High Throughput Synthesis and Chemical Modification of Graphene Materials for Supercapacitors	$29,870
5865	Vertically-Aligned Cu-Si Core-Shell Nanowire Array as a High-Performance Anode Material for Energy Storage	$80,064
5868	Irradiation Effects in the Graphene-Based Electronics	$8,187
5869	Modeling of the Plasma-Material Interface	$74,395
5870	Qualitative System Identification for Tumor Modeling: Knowledge Discovery from Observations of In Vivo Tumors	$38,642
5871	Plasmonic Effects for Improved Photocarrier Generation in Thin Film Solar Energy Materials	$89,618
5872	Can Neutrons Do It Probing Performance of Li-Ion Batteries in-situ	$74,902
5873	Computational Simulation of Catalytic Biomass Pyrolysis	$71,226
5874	High-Efficiency and Low-Cost Photovoltaic Cell Wafers via Plasma-Arc Lamp Processing of High Purity Silicon Powder	$91,129
5875	Electrolytic Hydrogen Production: A New Materials and Structural Approach	$89,979
5876	Probing Photovoltaic Processes at the Single Interface Level	$148,695

5877	Novel Standoff Sensing Method for Explosives with Rydberg State Spectroscopy and Radar Detection	$183,974
5878	Neutron Imaging for the Determination of Tumor Margins	$133,972
5879	White Light Produced by Scalable Biosynthesized Zinc-Gallate Mixture	$146,316
5880	Nuclear Materials FTIR (NMFTIR)	$7,363
5881	Thwarting Online Deception and Phishing with Honeypots and DNS Analysis	$132,009
5882	Using Small Angle Neutron Scattering (SANS) to Determine Gas Hydrate Pore-Scale Distribution	$103,001
5883	Synthesis of Ultrastrong Three Dimensional Networks from sp2 Carbon Using Low-Energy Molecular Transformation	$154,941
5884	Drag Reduction with Superhydrophobic Surfaces	$91,150
5893	Quantifying Economic Losses Associated with Climate Extremes under Conditions of Climatic and Socioeconomic Change	$467,901
5895	Quantum Dots: Potential Eco-friendly Light Harvesters for Solar Cells	$118,372
5896	Emissions Adsorption at Cold Start: An Energy-Efficient Emission Control Strategy for Hybrid Electric Vehicles and Plug-In Hybrid Electric Vehicles	$29,862
5897	Non-Destructive Biofuel Initiative	$142,274
5898	Air Stable Fe-C Core-Shell Nanocomposite for Degradation of Chlorinated Solvents	$118,118
5899	Novel Gas Scintillation Counters For Neutron Detection	$165,587
5901	New Neutron Scattering Experiments at the SNS	$52,338
5902	Design of Coaxial TiO2 Nanotube Arrays for Solar Energy Utilization	$72,103
5903	Decoder-Assisted Frame Synchronization for Orthogonal Frequency Division Multiplexing (OFDM)-Based Data Communications Systems	$170,051
5904	Effective Containment of Carbon Nanotubes (CNTs) as Sorbents for Oil Recovery Boom Products	$29,879
5905	Asynchronous Algorithms for Exascale Computations	$129,896
5906	Development of a Novel Electron Dynamics Simulation	$105,133
5908	Low Dimensional Multiferroicity	$156,950
5909	A Continuous Variable Source of Entanglement for Quantum Information	$186,878
5910	Advanced Algorithms and User Interfaces for Personalized Data Mining of Biomedical Images and Literature	$198,190

5911	Optical Characterization of Bacterial Dynamics in a Microfluidic Environment	$195,832
5913	Studies of charge particle emitters at the limits of bound nuclei	$223,692
5914	Control of the Ionic Flux by Nanofluidic Diodes	$186,551
5915	Unlocking Emergent Phenomena in Complex Materials through Spatial Confinement	$111,410
5919	Investigation of Quinone-Containing Organic Molecules as Lithium Cathodes	$72,226
5921	A fundamental investigation on the effects of high magnetic fields during the synthesis of iron-based type-II superconductors	$14,906
5935	First-principles Calculations and Computational Thermodynamic Modeling on Zn-S and Sn-S to support Identifying Thermal Decomposition Pathways for...	$51,330
5944	Turning Chalcopyrites Into Dilute Magnetic Topological Insulators (DMTI) via Magnetic Doping	$98,479
5956	Increase Power Conversion Efficiency of Broad-Area Laser Diode Array Coherent Beam Combining	$190,493
5957	Separation of Carbon Dioxide from Flue Gases	$89,990
5958	Freeform Fluidics	$190,291
5959	Direct Imaging of Energy Generation and Collection in Photovoltaic Nano-Materials: EBIC in the STEM	$108,912
5960	Tuning the Chemical Reactivity of Metal Nanoparticle Aggregates by Actively Controlling their Electronic Coupling	$83,638
5961	Boosting Organic Solar Cell Efficiency using Magnetism and Ferroelectricity	$104,774
5962	CuInS2/ZnS Core/Shell Nanocrystalsa A Designer Red Emitter to Revolutionize Solid-State Lighting Technology	$129,721
5963	Addressable Nanopore Array: Multiscale Fluidic Interface to Cell Culture	$75,491
5964	Microwave Activation for Advanced Catalytic Conversion of Biomass to Hydrocarbon Fuels and Chemical Feedstocks	$140,024
5965	Thermopower at the Atomic Scale	$30,842
5966	Enhancement of Ion Transport in Carbon Electrodes using Low-Amplitude, High-Frequency Electrical Signals	$30,051
5967	Transition-Metal Carbides As Ingredients for Active and Stable Bio-Oil Upgrading Catalysts	$102,092
5968	Probing Oxygen Reduction/Evolution Reactions on the Nanoscale: Towards viable Li-air Batteries	$59,725
5969	Authenticated Radio Frequency Identification	$113,956

5970	Large Scale Graphene Sheet Production by Chemical Vapor Deposition	$60,084
5971	Citizen Engagement for Energy Efficient Communities (CoNNECT)	$156,618
5977	Bacterial Iron and Uranium Redox Cycling in the Contaminated Subsurface	$468,838
5978	Advance Technology for High-Current Electromagnetic Isotope Separation	$8,299
5979	Light Water Reactor TRISO Particle-Metal-Matrix Composite	$25,370
5980	Intelligent Advanced Propulsion Systems	$33,612
5981	Algorithmic Challenges in Computational Science on the Path from Petascale to Exascale	$235,376
5982	Adaptive Target-Tracking in Multipath Scenarios	$139,919
5983	Novel nanotoxicology studies using noninvasive real-time microscopy and spectroscopy for physical and chemical characterization of materials and live biological systems	$103,891
5984	Development of Nano/Micro Vacuum Triode Structures Using Glass Fiber Drawing Methods	$199,371
6232	Integrative Signaling Modules Guiding Plants Response To Environmental Stresses	$432,913
6233	Development of the Neutron Based Biomembranes Initiative at NScD	$287,989
6234	A New Current-Source Boost Inverter Based Smart Power Electronic Interface for Connected Photovoltaic Applications	$6,810
6235	Real-Time, Portable Neutron Spectroscopy using a Filtered and Moderated Semiconductor Detector Array	$86,796
6237	Development Approach for Linking Glass Composition and Structure to Long-Term Performance	$46,613
6239	Scalable Connections for Diverse Information Stores: Knowledge Efficiencies for Streamlining National Health Informatics	$150,127
6240	Signals Solution Center Demonstration on HPC	$210,042
6241	High Energy Rechargeable Magnesium Batteries Based on Nanostructured Materials	$208,030
6242	Re-engineering Xylanase	$70,719
6243	Establishment of Welding Capability for Irradiated Materials	$93,547
6244	Demonstration of Electric Vehicle Dynamic On-Road Wireless Power Charging	$115,004

6245	An Accurate and Efficient Computational Methodology for Simulating Disordered Nanoscale Materials	$26,712
6248	Polar Perovskite Oxides with Local-Bond Frustration	$17,794
6249	Toward Biological Upgrading of Ethanol to C6 and C8 Ethyl Esters	$30,793
6250	Precision Long-Range Projectile Tracking	$12,466
6254	Event Enemeration for Security Analysis of Embedded Systems (EESAES)	$606
6255	Connecting Combinational and Geometric Tree-Like Structure in Complex Networks	$10,133
6256	Development of a Thermal-Hydraulics Simulation Tool for High-Fidelity Analysis of Transients in Small Modular Reactors	$1,809
	Total Cost for ORNL: $32,119,625	
	Total # of Projects for ORNL: 174	
	Total Administrative Cost $211,693	
PNNL - Pacific Northwest National Lab		
PN08003/2090	Adaptation of Existing Probabilistic Risk Assessments to Support Reactor Aging Management	$151,309
PN08018/2105B	Multiscale Charge and Ion Transport Simulations for Nanostructured Electrodes	$384,857
PN08046/2133	Machine Learning String Tools for Operational and Network Security	$5,532
PN09002/2170	A Real-Time Optical Spectroscopy Platform for Investigating Molecular Mineral Transformations for CO2 Storage	$316,830
PN09005/2173	Advanced Environmental Sampling Technology for Safeguards and Proliferation Detection	$248,518
PN09007/2175	Advanced Scalability for STOMP: Subsurface Simulation and Characterization at Extreme Resolution	$348,481
PN09008/2176	Advanced Sorptive and Signature Indicating Materials for Ultra-Trace Proliferation Detection	$404,267
PN09011/2179	Application of a Systems Biology Approach to Understanding Protein Function	$392,893
PN09012/2180	Application of Nitrogen Trifluoride (NF3) to the Nuclear Fuel Cycle	$134,504
PN09016/2184	Community Diversity and Functional Redundancy of Cellulytic Microbial Communities in Soil Aggregates	$331,900
PN09017/2185	Cyber-Attack Risk Inference Model	$101,057
PN09018/2186	Data Assimilation Tools for CO2 Reservoir Model Development	$250,452

PN09019/2187	Demonstration of On-Line Monitoring and Physics Based Prognostics	$124,312
PN09025/2193	Development of a Dual-Sided, Temperature-Controlled, Continuous-Flow Environmental Chamber	$392,496
PN09026/2194	Development of Exascale Algorithms for Molecular Modeling	$414,996
PN09033/2201	Exploring Architectures Suitable for Scientific Applications at Exascale Levels	$234,214
PN09034/2202	Friction Stir Welding of Creep-Resistant Oxide Dispersion Strengthened Alloys	$99,899
PN09035/2203	Geological Sequestration Software Suite Core Architecture and Simulation Framework	$269,995
PN09036/2204	Higher-Throughput, More Sensitive Stable Isotope Probing	$339,761
PN09039/2207	In Situ Imaging of Mineral-Supercritical CO2 Reactions with Atomic Force Microscopy	$124,978
PN09040/2208	In Situ Nuclear Magnetic Resonance Investigations of Trapping Mechanisms in CO2 Storage	$381,271
PN09042/2210	Isotopic Ratio Fluence Monitors for Canadian Deuterium Uranium (CANDU) and Pebble Bed Modular Reactor (PBMR) Plutonium Production Verification	$150,403
PN09046/2214	Material Interface Optimization in Extremely Thin Absorber Photovoltaics	$119,973
PN09047/2215	Microscale Spectroscopic Analyses of Cellulose Degradation and Uptake by a Microbial Community	$275,575
PN09050/2218	Multiscale Investigation of CO2 Behavior in Subsurface Under Extreme Conditions	$187,842
PN09051/2219	Multiscale Modeling from Molecular Reactions to Catalytic Reactors	$408,787
PN09053/2221	Multiscale Models for Microbial Communities	$239,980
PN09055/2223	On-Line Flaw Detection in Reactor Piping using Acoustic Emission and Guided Wave Ultrasonic Techniques	$139,386
PN09057/2225	Oxygen Optode for Chemical Imaging in Microfluidic Microbial Models	$230,334
PN09061/2229	Scalable Performance Diagnostics and Feedback for Massively Parallel Computers	$308,662
PN09062/2230	Sensitivity Analysis of Kalman Filter and Its Applications in Power Systems	$208,377
PN09067/2235	Surface Damage and Environment-Induced Cracking Precursors in Light Water Reactor Components	$130,738
PN09068/2236	Synthetic Biology Approach for Hydrocarbon Production in Microbial Photoautotrophs	$123,555

PN09071/2239	Transfer and Evaluation of the Community Atmosphere Model Parameterization Suite to Weather Research and Forecasting Model	$240,846
PN10001/2243	A Predictive Defense Model for the Smart Grid	$205,577
PN10002/2244	A Scalable Fault Tolerance Infrastructure and Algorithms with Programming Models and Scientific Applications	$368,940
PN10003/2245	Adaptive Cyber-Defense Using an Auto-Associative Memory Paradigm (ACAMP)	$125,227
PN10004/2246	Advanced Nondestructive Assay for Safeguards	$400,158
PN10005/2247	Alpha Voltaics	$199,994
PN10009/2251	Centralized Control vs. Decentralized Control: Implications of Demand Response and Distributed Resources on Power System Security	$123,230
PN10010/2252	CO2 Separation Scale-Up	$916,099
PN10011/2253	Combining Proteomic Technologies to Create a Platform for Spatiotemporal Enzyme Activity Profiling	$255,992
PN10014/2256	Computational Framework for Diagnostics, Validation and Intercomparison of Numerical Simulators for Geologic Sequestration	$219,974
PN10015/2257	Computational Studies of the Transport and Thermodynamic Characteristics of a Variety of Gases in Ionic Liquids	$199,680
PN10017/2259	Data Decomposition/Optimizations and Dynamic Load Balancing Mechanisms for Extreme Scale Computing in the Global Arrays Toolkit	$169,814
PN10018/2260	Deception for the Defense of Cyber Systems	$74,184
PN10019/2261	Detection and Characterization of Uranium Hexafluoride Reaction Products in the Environment	$263,904
PN10021/2263	Developing Ice Nucleation Parameterizations for Large-Scale Models	$203,378
PN10022/2264	Development of a Regional Energy and Infrastructure Systems Framework	$473,263
PN10024/2266	Development of Climate Modeling and Integrated Modeling at Regional Scales Framework and Functional Specifications	$299,030
PN10025/2267	Development of Inorganic Water Oxidation Electrocatalysts	$199,892
PN10026/2268	Development of Preparative Mass Spectrometry for the Creation of Novel Catalyst Materials	$249,685
PN10027/2269	Development of Prototype Integrated Earth System and Environmental System Models	$485,119
PN10028/2270	Development of Rechargeable Li/air Batteries	$401,340
PN10029/2271	Development of Regional Agriculture-Land Use Models	$360,707

PN10030/2272	Development of Regional-Global Climate Assessment Model	$544,183
PN10032/2274	Distinguishing Yersinia pestis from Natural Host and Laboratory Culture	$211,961
PN10033/2275	Enabling Hypothesis Driven Research and Discovery in Extreme Data	$138,958
PN10038/2280	Fundamentals of Carbonate Formation: Interactions of Carbon Dioxide with Supported Metal Oxide Clusters	$254,131
PN10039/2281	Geological Sequestration Software Suite: Numerical Model Development	$299,023
PN10040/2282	High Precision Isotope Forensics via Multi-Collector Multi-Collector Inductively Coupled Plasma Mass Spectrometry	$348,190
PN10042/2284	Identification of Functional Proteins Relevant to Bioenergy and Disease Pathology by Multiplexed Activity-Based Protein Profiling	$274,958
PN10043/2285	Improving the Characterization of Aerosols as Forcing Agents in the Climate System	$297,606
PN10044/2286	In Situ High-Pressure X-Ray Diffraction Investigation of Caprock Mineral Reactions With Water Solvated in Supercritical CO2	$214,048
PN10048/2290	Integrated Regional Earth System Model (iRESM) Prototype Regional Testbed Specification and Selection	$382,958
PN10049/2291	Integrating Power and Performance Modeling for Exascale Systems	$414,315
PN10050/2292	Light Source Photocathode Performance and Development	$309,007
PN10051/2293	Materials and Methods for Low Cost Photovoltaic Manufacturing	$246,808
PN10052/2294	Methodology and Tool Development for Rapid Assessments for CO2 Capture Technologies	$307,403
PN10055/2297	Micro-Fluidic Models for Studying Microbial Communities--Integration of Micro-Fluidic Model Experimentation, Multimodal Imaging, and Modeling	$411,818
PN10056/2298	Micromodel Pore-Scale Studies of Caprock-Sealing Efficiency and Trapping Mechanisms Related to CO2 Sequestration	$394,324
PN10057/2299	Mining the Data from Research on Dogs Exposed to Internally-deposited Radionuclides	$243,592
PN10058/2300	Molecular Structure and Interaction at Aqueous, Non-Aqueous Liquid Interfaces and Catalytic Solid Surfaces	$307,933
PN10060/2302	Multiphysics Capability Development and Application to Magnesium Alloys	$159,719

PN10061/2303	Next Generation Software for Automated Structural Identification of Metabolites	$169,080
PN10062/2304	Non-Metal Activation of Hydrogen for Energy Storage in Chemical Bonds	$209,909
PN10063/2305	Novel Carbon Capture Materials	$872,989
PN10064/2306	Operation and Process Optimization of Gasification and Carbon Capture Test Facility	$349,327
PN10065/2307	Photoelectrochemical Flow Battery	$248,741
PN10066/2308	Predicting Climate Change Impacts on Hydropower and Riverine Ecosystems	$153,914
PN10067/2309	Predicting the Feasibility of Geologic Co-Sequestration of CO2, SOx and NOx Under a Broad Range of Conditions	$196,645
PN10069/2311	Proteomics Measurements of Functional Redundancy and Stability Testing of Cellulose Degrading Anaerobic Microbial Communities Within Engineered Bioreactors	$351,516
PN10071/2313	Speciation and Distribution of f-Elements for Enhanced Separations and Safeguards	$240,957
PN10073/2315	The Analysis and Discovery of Influencing Factors in Social Media	$150,769
PN10074/2316	Three-Dimensional Structured Composite Nanomaterials for Energy Storage	$421,178
PN10077/2319	Underground Counting Capability Development and Potential Impacts	$304,641
PN10078/2320	Understanding the Sources and Consequences of Uncertainties	$278,415
PN10079/2321	Visualizing Uncertainty in Conceptual and Numerical Models for Geological Sequestration	$264,987
PN10080/2322	Vulcan: Unexpressed Communication	$175,533
PN11001/2323	A Multi-Modal Integration Framework for Chemical Imaging	$394,564
PN11002/2324	A Distributed Systems Architecture for the Power Grid	$150,171
PN11003/2325	A Prototype Systems Biology Knowledgebase Platform	$102,737
PN11004/2326	A Statistical State Prediction Methodology to Improve Reliability and Efficiency of Power System Operation	$221,384
PN11005/2327	A Virtual Testing Toolbox for Predicting the Properties and Behavior of Multiphase Materials in Disposal Environments	$389,874
PN11006/2328	Adaptive Multi-Signature Network Analysis System	$200,468
PN11007/2329	Advanced Statistical Network Models for the Integration of Experimental and Open Source Textual Data for Bioforensic Analyses	$199,893

PN11008/2330	Aspergillus niger as a Platform for exploitation of the Advanced Biofuel Producing Potential of Filamentous Fungi	$133,714
PN11009/2331	Attack Impact on the Electrical Grid as a Function of Network Topology	$48,157
PN11010/2332	Characterization of Energy Storage Systems Using In Situ and Ex Situ Nuclear Magnetic Resonance Spectroscopy	$388,404
PN11011/2333	Characterization of Signaling Networks in Single Cells	$249,692
PN11012/2334	Chemical Imaging Analysis of Environmental Particles	$236,015
PN11013/2335	Compressive Sensing for Threat Detection	$212,126
PN11014/2336	Conversion of Biomass to Jet Fuels	$122,216
PN11015/2337	Correlative High Resolution Imaging and Spectroscopy to Characterize the Structure and Biogeochemical Function of Microbial Biofilms	$319,514
PN11016/2338	Cyber/Physical Security Vulnerability Assessment Integration	$126,744
PN11017/2339	Dark Matter Science and Detector Development	$347,347
PN11018/2340	Data Management, Feature Extraction and Analysis at the Extreme Scale	$103,649
PN11019/2341	Data-Intensive Algorithms for Bioinformatics-Inspired Signal Detection	$164,996
PN11020/2342	Decision Support for Future Power Grid Organizations	$196,058
PN11021/2343	Developing Functionality and Performance Enhancements to the Global Array Toolkit	$245,683
PN11022/2344	Development of a Diagnostics and Controls Test Platform	$117,178
PN11023/2345	Development of an Autonomous and Configurable Marine Platform for Continuous and Long-term Monitoring of Near Shore Coastal Waters	$57,898
PN11024/2346	Development of Bifunctional Electrocatalysts for Rechargeable Lithium-Air Batteries	$207,227
PN11025/2347	Development of Coupled Flow, Thermal and Geomechanical Capability for Carbon Sequestration	$149,831
PN11026/2348	Development of Functionalized Nanoporous Materials for Bioenergy and Biomedical Applications	$251,161
PN11027/2349	Development of Lidar-Based, Fine-Scale Three-Dimensional Wind Measurements to Advance Fundamental Understanding of Near-Surface Winds for Climate and Other Models	$61,307
PN11028/2350	Development of New Soft Ionization Mass Spectrometry Approaches for Spatial Imaging of Complex Chemical and Biological Systems	$171,777

PN11029/2351	Development of Novel Functionalized Iron Oxide and ZVI Nanoparticles for the In situ Capture and Decomposition of Aquatic Contaminants	$99,223
PN11030/2352	Development of Parallel Multi-Reference Coupled Cluster Capabilities	$198,986
PN11031/2353	Domain-Independent Feature Vector for Time Varying Multivariate Data and Signature Characterization	$252,391
PN11032/2354	Enabling the Meaningful Exploitation of Integrated Regional Earth Systems Data	$272,564
PN11033/2355	Enhanced Bioremediation of Uranium Contamination at DOE Sites Via Novel Directed Evolution of Uranium Specific Reductase on Bacteriophage Surface	$248,228
PN11034/2356	Enhanced Light Extraction by Mesoporous Layer of Graded Refractive Index for Highly Efficient Organic Light-Emitting Devices	$131,957
PN11035/2357	Facet Specific Chemistry of Noble Metal Nanoparticles Using an Enhanced Scattering Infrared Scattering Near-Field Optical Microscope	$136,510
PN11036/2358	Geological Sequestration Software Suite Framework	$229,794
PN11037/2359	High-Capacity Reversible Metal Hydride Air Battery	$186,643
PN11038/2360	Identification of Damage Signatures in Advanced Reactor Materials - Exploring Design for Inspectability	$195,172
PN11039/2361	Improved Assessment Tool for Offshore Wind Resource Characterization	$140,975
PN11040/2362	In Situ Molecular-Scale Investigations of Reactions between Supercritical CO2 and Minerals Relevant to Geological Carbon Storage	$176,553
PN11041/2363	Increased Sensitivity and Improved Quantification of Th and U in Particles by SIMS	$41,906
PN11042/2364	Integrated Emissions	$766,150
PN11043/2365	Integrated Nano-Scale Imaging for Investigating Applications and Implications of Nanomaterials	$353,490
PN11044/2366	Integrating Multimodal Chemical Imaging Instrumentation by Data Reduction and Resolution Merge	$33,504
PN11045/2367	Intelligent Networked Sensors Capable of Autonomous, Adaptive Operations in the Electric Power System	$204,948
PN11046/2368	Linear Algebra Solvers and Associated Matrix-Vector Kernels for Power Grid Simulations	$184,962
PN11047/2369	Low Frequency Electromagnetic Interrogation Techniques for Container Content Signature Detection	$149,541
PN11048/2370	Low Level Argon-42 Measurement Analysis (LLAMA)	$99,867

PN11049/2371	Mapping Molecular Dynamics Algorithmic Parallelism to Heterogeneous Architectures	$298,455
PN11050/2372	Massively Parallel Sequencing Technology for the Forensic Identification of the "Unknown" Biological Threat Agent(s) Recovered from the Biological Crime Scene	$152,826
PN11051/2373	Meta-Material Coatings for Daylighting Windows	$91,984
PN11052/2374	Microbial Processes Accompanying Deep Geologic CO2 Sequestration	$122,867
PN11053/2375	Modeling of Distributed Energy Resources in the Smart Grid	$208,000
PN11054/2376	Multi-Resolution Data Model and Directed Data Reduction, Reconstruction and Aggregation	$189,956
PN11055/2377	Multiscale Synthetic Studies Targeted Towards the Development of Nanostructured Heterogeneous CO2 Reduction Catalysts	$191,347
PN11056/2378	Nanoscale-Macroscale Three-Dimensional Integration Using High Performance Computing	$249,939
PN11057/2379	Neutron Signature Detection Requirements for Identifying Warhead Configurations	$168,479
PN11058/2380	New Adsorbent Materials for Desiccant Cooling	$127,320
PN11059/2381	Novel N/gamma Flux Monitoring Materials for Safeguards and Proliferation Detection	$183,454
PN11060/2382	Optical Upconversion for Passive and Active Millimeter and Terahertz Imaging	$174,550
PN11061/2383	Photocathode Development for Next-Generation Light Sources	$108,057
PN11062/2384	Photon Signatures for Enhanced Bulk and Residue Explosives Detection	$308,574
PN11063/2385	Quantify the "State of Health" of Nuclear Structure/Materials with an Inverse Resonance Inspection Algorithm	$195,052
PN11064/2386	Rare Earth-less Permanent Magnet	$239,143
PN11065/2387	Real-time High-Performance Computing Infrastructure for Next-Generation Power Grid Analysis	$170,058
PN11066/2388	Scalable Sensor Data Management Middleware	$200,227
PN11067/2389	Signature Discovery Analytic Framework	$199,485
PN11068/2390	Signature Quality Metrics	$200,213
PN11069/2391	Single Node Optimizations for Extreme Scale Systems	$288,482
PN11070/2392	Site Specific Atomic Resolution Probing of Structure-Property Relationship Under Dynamic and/or Operando Conditions Using In Situ and Ex Situ Chemical Imaging Based on Multi-Instrument Approach	$413,317

PN11071/2393	SoftShuffle: A Game Changer for Secure Software System Implementation	$159,176
PN11072/2394	Stabilized Li Metal Anode for Li Batteries	$429,276
PN11073/2395	Statistically Significant Forensic Fingerprinting: Protein Analysis of Biological Agents	$113,191
PN11074/2396	Synergistic Integration of Feature Recognition and Analysis for Chemical Imaging Data	$75,029
PN11075/2397	The Statistical Mechanics of Complex Process in Bulk and Interfacial Environments	$160,526
PN11076/2398	Time-Stamped Coincidence-Sampled Gamma-Ray Spectral Data Analysis	$50,180
PN11077/2399	Uncertainty Quantification and Risk Assessment Pipeline for Carbon Sequestration	$151,816
PN11078/2400	Understanding the Processes that Govern Subsurface Microbial Communities	$48,931
PN11079/2401	Vapor Detection of Non-Volatile Explosive Compounds by Enhanced Trace Analytical Methods	$342,775
	Total Cost for PNNL: $40,247,537	
	Total # of Projects for PNNL: 168	
	Total Administrative Cost ($11,830)	
PRINCE - Princeton Plasma Physics Lab		
PPPL-012	Creation of a Plasma Source for Diamond Thin Film Deposition	$81,258
PPPL-016	X-ray Imaging Schemes with Matched Pairs of Spherically Bent Crystals	$137,250
PPPL-017	Full-wave Modeling of Wave-Plasma Interaction in Earth's Magnetosphere	$139,556
PPPL-018	Symplectic Integrators for Long-time Simulations of Multi-scale Dynamics of Gyro-center Particles	$44,787
PPPL-019	Multiscale Gyrokinetics for Magnetic Reconnection Plasmas	$74,796
PPPL-020	Development of Physical Models and Numerical Tools for Plasmas Interacting with the Absorbing Surface	$68,124
PPPL-021	Study of Magnetic Reconnection in Partially Ionized, Low-Temperature Plasmas	$148,723
PPPL-023	High Density Plasma Capsule for Raman Backscatter	$150,041
PPPL-024	Development of a Program of Plasma-Facing Components (PFCs) and Investigation of Plasma-Material Interactions Involving the PFCs	$514,561
PPPL-025	Remote Participation in International Fusion Experiments in the ITER Era	$111,540
PPPL-026	Magnetic Fusion Energy (MFE) Pilot Plant Study	$495,445

PPPL-027	Laboratory for Plasma-Based Nanotechnologies	$248,835
PPPL-028	Production of TC-99m absent HEU	$73,922
PPPL-029	Development of Next Step Experiments for Plasma Astrophysics	$77,963
PPPL-030	Design Study for a Flowing-wall Liquid Lithium Tokamak	$65,136
	Total Cost for PRINCE: $2,431,937	
	Total # of Projects for PRINCE: 15	
	Administrative Cost Paid by Laboratory overhead	
PTX - Pantex Plant		
PX07007	Reactions of Hydrofluoroethers	$1,905
PX07008	Composition and Strength of Ta-Based Welds for Storing SNM Materials	$125,970
PX08008	Benchtop High Explosives Testing	$41,126
PX08011	Determination of Hansen Solubility Parameters for Cleaning Applications	$404
PX09001	Evaluation of Suspension Fluids Used In Laser Light Scattering	$6,567
PX09002	Gas Reactions Within Sealed Volume of LANL and LLNL Weapons	$207,828
PX09003	Optimization of High Explosive Molecular Weight Binder Analysis in Core Surveillance	$25,018
PX09004	Ultra Performance Liquid Chromatography	$24,528
PX09007	Lightning and Production Throughput	$86,704
PX09008	Sylgard Viscous Flow Testing	$38,814
PX09010	Digital Image Correlation (DIC)	$8,325
PX09013	Severe Insults to High Explosives	$334,592
PX09015	Fracture Mechanics of HMX Based HIgh Explosive Components	$68,081
PX09016	Precision Coating PBX Formulation Process--Characterization and Testing	$308,796
PX10001	RF ID Tracking of Medical Records	$266,654
PX10002	Effects of Temperature on Explosives	$86,980
PX10004	Test Equipment Environmental Sensor	$63,058
PX10005	Portable Digital Microscopy Station (PDMS)	$91,194
PX10007	Drip casting to separate precious metals from base metals	$353,040
PX10009	Laser Gas Sampling of unweldable tube stock	$645,550
PX11013	System Dynamic Modeling	$4,262
PX11014	Adiprene replacement formulation and dynamic mixing requirements	$31,808
	Total Cost for PTX: $2,821,204	
	Total # of Projects for PTX: 22	

	Total Administrative Cost $276,166	
SLAC - SLAC National Accelerator Laboratory		
2011-01	Development of an Ultralow Emittance Lattice and Study of Beam Dynamics for PEP-X	$205,758
2011-02	Nanomaterials and Their Characterization for Energy Storage	$271,349
2011-03	Study of Diamondoids as Novel Cathode Materials for Light Source	$119,854
2011-04	SEM Fe Probe Surface Science Study	$223,538
2011-05	Development of an Integrated TeV Gamma-Ray Camera Readout System	$358,451
2011-06	Advanced Modeling and Simulation Computational Modeling and Simulation of Electron Dynamics and Excited States	$330,460
2011-08	Development of the Next Generation Laser for LCLS	$446,693
2011-09	Proof-of-Principle for Mass Production of Large Germanium Detectors for Large Scale Dark Matter Search Experiments	$398,782
2011-10	Development of Ultrafast High-Repetition Rate Capabilities for Spear 3 and PEP-X	$284,641
2011-11	Development of RF-Based Insertion Devices for Storage Rings and Free Electron Lasers	$307,975
2011-12	Climate Change Science - Snapshots of Heterogeneous Ice Nucleation with LCLS	$114,839
2011-13	In-Situ X-ray Characterization and Nanoscale Imaging of Energy Storage Nanomaterials	$134,211
2011-14	Enabling Complex Photon Science Analysis Through SciDB	$158,933
2011-15	First Generation X-Band RF Gun	$187,422
2011-16	Correlated Electron Physics at Oxide Interfaces	$17,444
	Total Cost for SLAC : $3,560,350	
	Total # of Projects for SLAC : 15	
	Administrative Cost Paid by Laboratory overhead	
SNL - Sandia National Lab		
120208	Cosmic-ray Hydrometrology for Land Surface Studies	$42,188
130699	Advanced Optics for Military Systems	$290,563
130700	Highly Producible Focal Plane Array	$677,432
130705	Boundary-Layer Transition on Maneuvering Hypersonic Flight Vehicles	$340,642
130707	Directed Robots for Increased Military Manpower Effectiveness	$460,167

130711	Information Systems Analysis using Agent Collectives	$343,001
130715	Malware Attribution through Binary Analysis	$353,843
130720	Next Level Technology Development for Satellite Based Processing Architectures	$531,357
130727	Silicon Microphotonic Backplane for Focal Plane Array Communications	$441,008
130729	Velocity Independent Continuous Tracking Radar	$556,175
130731	Wavelength-Division-Multiplexed (WDM) Free Space Optical Communication Using a High Repetition Rate Coherent Broadband Short Pulse Laser	$386,568
130732	"Equation-Free" Simulation Methods for Multiple Timescale Diffusion Processes in Solids	$495,393
130734	Bayesian Data Assimilation for Stochastic Multiscale Models of Transport in Porous Media	$528,139
130739	Computational Mechanics for Geosystems Management to Support the Energy and Natural Resources Mission	$1,152,972
130740	Experimental Characterization of Energetic Material Dynamics for Multiphase Blast Simulation	$696,718
130741	Nanomanufacturing: Nano-Structured Materials Made Layer-by-Layer	$1,033,442
130742	Optimization of Large-Scale Heterogeneous System-of-Systems Models	$818,496
130743	System-Directed Resilience for Exascale Platforms	$484,012
130744	An Ion Beam Platform for Screening and Studying Materials for Use in Fast Neutron Environments	$474,341
130745	Cognitive Stakeholder Modeling for Resource Management	$600,383
130748	Linking Ceragenins to Water-Treatment Membranes to Minimize Biofouling	$493,509
130749	Membranes and Surfaces Nano-engineered for Pathogen Capture and Destruction	$389,571
130750	Modeling of Advanced Nuclear Fuel Pins	$514,051
130752	Scalable Microgrid for a Safe, Secure, Efficient, and Cost Effective Electric Power Infrastructure	$520,070
130755	A C. elegans-Based Foam for Rapid On-Site Detection of Residual Live Virus	$556,667
130764	Uncooperative Biometric Identification at a Distance	$485,679
130766	Vulnerability of Multi-network Infrastructure to Cascading Failure: Design of Robustness to Novel or Orchestrated Perturbations	$444,638
130767	Architecturally Controlled Nanocathode Materials for Improved Rechargeable Batteries	$475,814

130769	Bio-Inspired Nanocomposite Assemblies as Smart Skin Components	$459,758
130771	Enabling Graphene Nanoelectronics	$921,332
130772	Hierarchical Electrode Architectures for Electrical Energy Storage and Conversion	$559,543
130773	Solution Deposited Transparent Conductive Oxides for Nanocomposite Solar Cells	$422,648
130774	High Temperature, Large Format FPAs for Emerging Infrared Sensing Applications	$485,856
130775	Narrow-Linewidth VCSELs for Atomic Microsystems	$473,348
130777	Phonon Manipulation with Phononic Crystals	$631,151
130778	Real-Time Studies of Battery Electrochemical Reactions Inside a Transmission Electron Microscope	$407,420
130779	Science-based Solutions to Achieve High Performance Deep UV Laser Diodes	$544,458
130780	Mechanisms for Charge Transfer Processes at Electrode-Solid-Electrolyte Interfaces	$594,021
130781	A Systems Biology Approach to Understanding Viral Hemorrhagic Fever Pathogenesis	$749,237
130782	Biomolecular Interactions and Responses of Human Epithelial and Macrophage Cells to Engineered Nanomaterials	$468,880
130783	From Algae to Oilgae: In Situ Studies of the Factors Controlling Growth and Oil Production in Microalgae	$455,698
130785	K-Channels: On/Off Switches of Innate Immune Responses	$448,553
130787	Robust Automated Knowledge Capture	$551,783
130793	Field and Charge Penetration By Lightning Burnthrough	$295,213
130794	MEMS-Based Non-Volatile Memory Technology	$398,704
130797	Novel Dielectrics with Engineered Thermal Weaklink	$362,564
130798	Signal Processing Techniques for Communication Security	$270,461
130799	Solid State Neutron Sources	$475,095
130800	Understanding and Predicting Metallic Whisker Growth and its Effect on Reliability	$406,083
130801	Vapor Phase Lubrication for Advanced Surety Components	$549,596
130802	Advanced Tactical HPM System via NLTL and LWA	$641,631
130804	Confinement of High-Temperature Laser-Produced Deuterium Plasmas Using Pulsed Magnetic Fields	$316,700
130806	Material Development for Radiation Hardness	$387,859
130807	Modeling Ramp Compression Experiments using Large-Scale Molecular Dynamics Simulation	$449,815

130808	New Density Functional Theory Approaches for Enabling Prediction of Chemical and Physical Properties of Heavy Elements	$340,648
130809	Study of Radioactive Blast Waves Generated on the Z-Beamlet Laser	$220,204
130810	Computational Models of Intergroup Competition and Warfare	$28,359
130813	Development and Characterization of 3D, Nano-Confined Multicellular Constructs for Advanced Biohybrid Devices	$254,911
130814	Development of a Structural Health Monitoring System for the Assessment of Critical Transportation Infrastructure	$28,103
130817	Evaluation of Baseline Numerical Schemes for Compressible Turbulence Simulations	$6,095
130818	Interfacial Electron and Phonon Scattering Processes in High-Powered Nanoscale Applications	$254,368
130820	Nanocomposite Materials for Efficient Solar Hydrogen Production	$26,425
130821	Nanotexturing of Surfaces to Reduce Melting Point	$58,664
130823	Neural Correlates of Attention: Correlates of Decision Making for Action	$56,500
130826	Investigation of the Richtmyer-Meshkov Instability on a Multimode Interface	$29,803
130827	Relating Polymer Dynamics to Molecular Packing	$29,695
131302	Metamaterial Science and Technology	$3,795,331
131303	Reimagining Liquid Transportation Fuels: Sunshine to Petrol	$3,518,071
131305	Featureless Tagging Tracking and Locating	$1,482,487
131503	High Frequency RF Effects	$230,465
131541	Security Through Unpredictability	$253,212
134529	Complex Adaptive Systems of Systems (CASoS) Engineering and Applications to the Global Energy System (GES)	$621,517
135790	Hazard Analysis and Visualization of Dynamic Complex Systems	$64,810
137299	Processor Modeling for use in Large-Scale Systems Models	$81,021
141076	Responsive Nanocomposites	$596,096
141505	An Internet Emulation System to Enable Predictive Simulation of Nation-Scale Internet Behavior	$1,072,102
141506	Effects of Morphology on Ion Transport in Ionomers for Energy Storage	$935,554

141508	Multiscale Models of Nuclear Waste Reprocessing: From the Mesoscale to the Plant-Scale	$1,023,251
141509	Predictive Multiscale Modeling of Thermal Abuse in Transportation Batteries	$935,922
141510	Risk Assessment of Climate Systems for National Security	$868,440
141511	Streaming Data Analysis for Cybersecurity	$923,634
141512	Calculations of Charge Carrier Mobility and Development of a new Class of Radiation Sensors for Real-time 3D Source Location	$405,883
141513	Chirality-Controlled Growth of Single-Walled Carbon Nanotubes	$516,513
141514	Development of Electron Nano-Probe Technique for Structural Analysis of Nanoparticles and Amorphous Thin Films	$496,288
141515	Dynamically and Continuously Tunable Infrared Photodetector Using Carbon Nanotubes	$533,171
141517	Efficient, High-Voltage, High-Impedance GaN/AlGaN Power FET and Diode Switches	$491,584
141518	Electrodeposition of Scalable Nanostructured Thermoelectric Devices with High Efficiency	$630,529
141519	Greater-Than 50% Efficient Photovoltaic Solar Cells	$1,281,983
141520	Microfabricated Nitrogen-Phosphorus Detector: Chemically Mediated Thermionic Emission	$796,250
141521	Nanoporous Polymer Thin-Films from Tri-Block Copolymers	$426,667
141522	Surface Engineering of Electrospun Fibers to Optimize Ion and Electron Transport in Li+ Battery Cathodes	$461,036
141523	Understanding the High Temperature Limit of THz Quantum Cascade Lasers (QCLs) Through Inverse Quantum Engineering (IQE)	$490,830
141524	Construction of an Abiotic Reverse-Electron Transfer System for Energy Production and Many Biocatalytic Pathways	$344,092
141528	From Benchtop to Raceway: Spectroscopic Signatures of Dynamic Biological Processes in Algal Communities	$771,237
141529	From Sensing to Enhancing Brain Processes	$496,757
141530	Genome-Wide RNA Interference Analysis of Viral Encephalitis Pathogenesis	$521,004
141531	Neurological Simulations for Emerging Brain Maps	$576,242
141532	Real-time Neuronal Current Imaging of the Human Brain to Improve Understanding of Decision Making Processes	$391,854

141533	Advanced K-Shell X-Ray Sources for Radiation Effects Sciences on Z	$457,356
141534	High Peak Power / Pulse Energy Laser Sources	$459,952
141535	Mixed Hostile-Relevant Radiation Capability for Assessing Semiconductor Device Performance	$487,330
141537	Stability of Fusion Target Concepts on Z	$981,916
141538	Ultrashort Pulse Laser-Triggering of Long Gap High Voltage Switches	$611,813
141540	X-Ray Thomson Scattering Measurements of Warm Dense Matter	$1,194,157
141541	2D Tracking of Maneuvering and Closely Spaced Targets and Fusion into 3D Tracks	$438,494
141542	Novel Techniques for the Geolocation of Sources Using Timing-Based Sensors	$159,936
141543	Air Delivered SIGINT Sensor System Study	$290,756
141587	Augmented Cognition Tool for Rapid Military Decision Making	$341,136
141588	Leveraging Information between Heterogeneous Modeling and Simulation Tools	$474,238
141589	Development of 3D Tools for Threat Signatures	$204,325
141590	Explosively Driven High Power Microwave Source	$396,524
141593	High-Efficiency High-Power Laser for Directed Energy Application	$492,600
141594	High-Performance, High-Density Interconnect Technologies for Next Generation Satellite Systems	$525,463
141595	Hybrid Femtosecond/Nanosecond Pulsed Laser Machining	$172,407
141596	Investigating Payloads and Missions for CubeSat Systems	$865,961
141597	Laser Characterization and Prediction for Silicon Sensors	$666,992
141598	Remote Laser Location and Identification	$650,598
141600	Localized Ion Radiation Effects	$142,731
141601	Low Level Control Systems Assessment	$346,839
141602	"ExtremeSS" Low Probability of Detection, Ultra-wideband Communications	$455,780
141603	Formal Methods for Latent Vulnerability Detection in Source Code	$127,898
141604	Optimization of Time-Critical Constellation Scheduling	$373,965
141605	Packaged Integrated Thin Sensor	$774,796
141606	Remote Sensing of Gases for Nuclear Proliferation Detection and Green House Gas Monitoring	$393,586
141607	Hybrid AI/Cognitive Tactical Behavior Framework for LVC Simulations	$541,860

141608	Self-Consuming Structural Composites	$291,310
141609	Solid-State Replacement of Traveling Wave Tubes for Next Generation SAR	$244,604
141610	Space Payload Flight Software Architecture	$294,273
141611	Tightly Coupled Navigation and Targeting	$245,752
141612	A Process and Tool Chain for Evaluating Wireless Mobile Devices	$311,706
141613	Use of Phase Conjugation in High Energy Laser Systems	$370,995
141614	Advanced Battery Materials for Improved Mobile Power Safety	$656,816
141615	Bridging the Gap Between Atomistic Phenomena and Continuum Behavior in Electrochemical Energy Storage Processes	$419,992
141616	Development of Coherent Germanium Neutrino Technology (CoGeNT) for Reactor Safeguards	$396,191
141617	First-Principles Flocculation as the Key to Low Energy Algal Biofuels Processing	$964,045
141618	Novel Room Temperature Synthesis of Nuclear Fuel Nanoparticles by gamma-Irradiation	$643,649
141619	Programmable Nanomaterials for Reversible CO2 Sequestration	$683,609
141668	Radionuclide Transport from Deep Boreholes	$677,570
141669	Safeguards and Arms Control Authentication	$293,315
141670	Transportation Energy Pathways	$493,864
141676	Characterizing Pathogens Based on Host Response	$474,216
141678	Graded Engagement of Small Aircraft and UAVs for Physical Protection	$347,136
141680	Rapid Radiation Biodosimetry to Mitigate Exposure Scenarios	$597,177
141682	The Web Sensor: Advanced Analytics for Web-Based Intelligence Analysis	$243,552
141683	Advanced Gas Transfer Systems Technology	$322,068
141688	Fully Integrated Switchable Filter Banks for Advanced Radar Applications	$393,378
141689	Meso Scale Highly Elastic Structures (MESHES) for Surety Mechanisms	$414,718
141690	Nanoparticle Based Filler for Neutron Generator Epoxies	$190,673
141691	Selective Stress-based Microcantilever Sensors for Enhanced Surveillance	$599,007
141692	The Role of Hydrogen Isotopes in Deformation and Fracture of Aluminum Alloys	$326,516

141700	Trusted Computing Solution for an Un-Trusted Computing Environment	$124,186
141704	Nature versus Nurture in Cellular Behavior and Disease	$762,541
141712	Understanding the Fundamentals of Plastic Deformation	$257,614
141927	Development of First-Principles Methodologies to Study Electro-Catalytic Reactions at Metal/Electrolyte Interfaces	$59,946
141928	Covalently Cross-Linked Diels-Alder Polymer Networks	$26,376
141929	Effect of Doping on the Performance of Solid-Oxide Fuel Cell Electrolytes Produced by a Combination of Suspension Plasma Spray and Very Low Pressure Plasma Spray	$46,786
141930	Quantum Enhanced Technologies (QET)	$29,901
141931	Remote Sensing Using Optical Filaments	$24,078
141932	Modeling and Simulation of Explosive Dispersal of Liquids	$29,578
141933	MBE Growth and Transport Properties of Carbon-Doped High Mobility Two-Dimensional Hole Systems	$29,987
142042	RapTOR: Rapid Threat Organism Recognition	$4,234,996
142044	Power Reduction Techniques for Modern Modulation Schemes	$30,644
142440	Metrology of 3D Nanostructures	$26,172
142441	Genetic Engineering of Cyanobacteria as Biodiesel Feedstock	$242,113
142540	Surety Portal	$528,268
142543	Enabling Self-Powered Ferroelectric Nanosensors: Fundamental Science of Interfacial Effects Under Extreme Conditions	$464,481
145832	Integration of Block-Copolymer With Nanoimprint Lithography: Pushing the Boundaries of Emerging Nanopatterning Technology	$511,287
145970	Performance Monitoring and Enhancement in Data Center	$29,830
146013	Advanced Constitutive Models for Thermally Activated Shape Memory Polymers: Connecting Structure to Function	$52,250
146152	Scalable Assembly of Patterned Ordered Functional Micelle Arrays	$541,931
147374	Characterization of Failure Modes in Deep UV and Deep Green LEDs Utilizing Advanced Semiconductor Localization Techniques	$220,764
147942	Photoelectronic Characterization of Heterointerfaces	$213,997

148066	Guiding Options for Optimal Biofuels	$245,648
148067	Nanoparticle Modification of Photodefined Nanostructures for Sensor and Energy Applications	$18,085
148196	Laser-Based Radiation-induced Conductivity in Kapton Polyimide Dielectrics at High Dose Rates	$210,091
148373	Modeling a Chemical Defense Strategy	$246,925
148549	Ion-Photon Quantum Interface: Entanglement Engineering	$247,217
148898	Diffusion Among Cognitively Complex Agents in Limited Resource Settings	$233,451
148900	Localized Temperature Stable Dielectrics for Low Temperature Co-Fired Ceramic	$246,844
148957	Fundamental Hydrogen Interactions With Beryllium Surfaces: A Magnetic Fusion Perspective	$237,809
149404	Room Temperature Detector Array Technology for the Terahertz to Far-infrared	$51,484
149563	Ground Water and Snow Sensor Based on Directional Detection of Cosmogenic Neutrons	$171,502
149568	Development of Chemiresponsive Sensors for Detection of Common Homemade Explosives	$195,626
149655	Effective Programming Tools and Techniques for the New Graph Architecture HPC Machines	$196,249
149705	Ultrasensitive, Amplification-Free Assays for Detecting Pathogens	$253,377
150115	Attosat Lorentz Augmented Orbit (LAO) Flight Dynamics	$19,684
150123	Stochastic Study of Microparticle Adhesion due to Capillary Condensation	$244,762
150638	Studies in High Rate Solidification	$191,237
150774	Polyoxometalate "Solutions" for Energy Storage	$245,887
150966	An Adaptive Approach to Modeling Human Reasoning	$246,143
150968	Elucidating the Role of Interfacial Materials Properties in Microfluidic Packages	$238,725
151170	A Model-Based Approach for Detection and Avoidance of Subversion in System Development Tool Chains	$213,509
151174	Fundamental Study of Metal/Oxide/Metal Memristor Physics and Device Optimization	$240,917
151263	First Principles Prediction of Radio Frequency Directed Energy Effects	$291,495
151264	Multi-polarization and Change Detection Exploitation of Inverse Synthetic Aperture Radar Data	$439,299
151265	Ultra Thin-Power Systems for Autonomous National Security Applications	$97,764

151266	Ultra-Thin, Temperature Stable, Low Power Frequency References	$294,932
151267	Efficient Thermal Neutron Detection Using Gadolinium Conversion Layers	$371,651
151269	Cryogenic FPA Optical Interconnects	$296,587
151270	Trusted Software Architecture for Multi-Processor Embedded Computing	$483,589
151272	The Birth and Death of Topics	$182,303
151273	Nephelae: Harnessing the Cloud	$384,659
151274	Static Current Measurement of FPGA Devices	$219,038
151275	Matterwave Interferometer for Seismic Sensing and Inertial Navigation	$451,469
151276	Spectro-Temporal Data Application & Exploitation	$572,462
151277	Adaptive Automation for Supervisory Control of Streaming Sensors	$494,864
151278	Phase Diversity for Advanced Systems	$267,570
151279	Localized Die Thinning for F/A of Advanced CMOS Designs	$205,008
151280	Chip-Scale Datacom Component Design	$134,631
151281	Remote Identification and Characterization of Advanced Materials using Hyperspectral Imaging	$227,705
151283	Novel Signal Transmission and Intercept Methods Using Applied Information Theory and COTS Radios	$109,906
151284	Automated Severity Assignment for Software Vulnerabilities	$336,679
151285	Command Intent on the Future Battlefield: One-to-Many Unmanned System Control	$356,397
151286	Multi-Mission Software-Defined RF Spectrum Processing	$225,347
151287	A Scalable Emulytics Platform for Observation of Windows-centric Network Phenomena	$369,532
151288	Quantifiably Secure Power Grid Operation, Management, and Evolution	$684,154
151289	Predicting Structure-Property Relationships for Interfacial Thermal Transport	$504,825
151291	Physics-Based Multiscale Stochastic Methods for Computational Mechanics	$618,004
151292	Network and Ensemble Enabled Entity Extraction in Informal Text (NEEEEIT)	$520,837
151293	Kalman-Filtered Compressive Sensing for High Resolution Estimation of Anthropogenic Greenhouse Gas Emissions from Sparse Measurements at Global Scale	$447,764

151294	Multiscale Modeling for Fluid Transport in Nanosystems	$380,988
151295	Statistically Significant Relational Data Mining	$528,821
151297	Integrated Nano- and Quantum Electronic Device Simulation Toolkit	$569,504
151299	Control and Optimization of Open Quantum Systems for Information Processing and Computer Security	$399,614
151300	CO2 Reuse Innovation - Novel Approach to CO2 Conversion Using an Adduct-Mediated Route	$378,232
151301	Development of Alkaline Fuel Cells	$352,476
151302	Constitutive Framework for Simulating Coupled Clay/Shale Multiphysics	$462,393
151303	In-Situ Diagnostics for Fuels Model Validation with ACRR	$447,280
151304	Tier 2 Development of Sandia's Air Bearing Heat Exchanger Technology	$383,822
151305	Fundamental Study of CO2-H2O-Mineral Interactions for Carbon Sequestration, with Emphasis on the Nature of the Supercritical Fluid-Mineral Interface	$554,324
151307	Development and Deployment of a Field Instrument for Measurements of Black Carbon Aerosols	$206,122
151308	Tailoring Next-Generation Biofuels and their Combustion in Next-Generation Engines	$1,071,228
151310	Simulation of Component Transport and Segregation in Nuclear Fuels	$390,882
151312	Extending Algorithms for Pattern Detection in Massive Data Sets to Commodity Cloud Platforms	$395,722
151313	Development of a Modeling Framework for Infrastructures in Multi-Hazard Environments	$391,123
151314	Energy Security Assessment Tools	$455,656
151315	Using Fast Neutron Signatures for Improved UF6 Cylinder Enrichment Measurements	$296,892
151316	Open Source Information Verification	$470,258
151317	High-Interest Event Detection in Large-Scale, Multi-Modal Data Sets: Proof of Concept	$123,514
151318	Human Cargo Detection Via a Microfabricated Pulsed-Discharge Ionization Detector	$325,048
151320	Standoff Ultraviolet Raman Scattering Detection of Trace Levels of Explosives	$196,110
151321	Predictive Modeling of Non-Ideal Explosives	$744,881
151322	Desorption Electrospray Ionization Differential Mobility Spectrometry (DESI-DMS) for Homemade Explosives Detection	$190,547

151323	Advanced High Security Command and Control Interface (AHSC2I)	$412,730
151324	Genomics-Enabled Sensor Platform for Rapid Detection of Viruses Related to Disease Outbreak	$356,317
151325	High Energy Resonance Radiography by Double Scatter Spectroscopy	$443,566
151326	Enhanced Micellar Catalysis	$314,783
151327	Anomaly Metrics To Differentiate Threat Sources From Benign Sources in Primary Vehicle Screening	$151,013
151328	Nanoscale Mechanisms in Advanced Aging of Materials during Storage of Spent High Burnup Nuclear Fuel	$438,393
151329	Active Infrared Plasmonics	$536,580
151330	Pathways Toward Laser Hardening Via Systematic Characterization	$190,545
151332	Monolithically-Integrated Coherent Mid-Infrared Receiver	$514,321
151333	Non-Abelian Fractional Quantum Hall Effect for Fault-Resistant Topological Quantum Computation	$398,121
151334	Germanium on Silicon Optoelectronics	$597,013
151335	Fundamental Investigation of Chip-Scale Vacuum Micropumping (CSVMP)	$334,019
151336	Coherent Phonon Generation Through Nanoscale Enhanced Light-Matter Interaction: Towards Novel Silicon Lasers, Broadband Phononic Signal Processing and Optically Powered Micromechanics	$575,146
151337	Photodefined Micro/Nanostructures for Sensing Applications	$442,815
151338	Theoretical and Experimental Studies of Electrified Interfaces Relevant to Energy Storage	$688,908
151339	Developing Thermoelectric Cryo-Cooling	$794,800
151340	Improving the Electrical and Thermal Resistance of Nanoscale Contacts	$637,810
151341	Advanced High Z NanoScintillators	$535,373
151343	Tailoring Thermal and Electric Transport Properties Through Solid-State Self-Assembly	$484,821
151344	Understanding and Controlling Low-Temperature Aging of Nanocrystalline Materials	$679,067
151345	From Neurons to Algorithms	$442,797
151346	Incremental Learning for Automated Knowledge Capture	$330,218
151347	A Comprehensive Approach to Decipher Biological Computation to Achieve Next Generation High-performance Exascale Computing	$628,256

151348	Systems Biology in 3D : Monitoring and Modeling the Dynamics of Francisella tularensis-associated Granuloma Formation	$518,452
151349	Reverse Engineering the Host-Virus Interaction Using an Artificial Host Cell	$573,709
151350	Biomimetic Lung Toxicity Screening Platform (bioMIMIC)	$465,852
151351	Development of Ab Initio Techniques Critical for Future Science-Based Explosives R&D	$395,643
151352	Metal-Insulator Transition Based Limiters for Radar Receiver Protection	$536,567
151353	Thermoelectric Materials: Mechanistic basis for predictive aging models and materials design	$863,681
151354	Software-Defined Telemetry Using a Programmable Fuzing Radar	$316,336
151355	Non-destructive Gas Pressure Measurements in Neutron Tubes and Generators	$382,001
151356	All Optical Fiber Architecture for Direct Optical Ignition	$539,512
151357	MEMS Photoacoustic Spectroscopy	$506,687
151358	Fail Safe Feature for Abnormal Thermal Environments Using Shape Memory Alloys	$432,784
151359	New Composite Separator Pellet to Increase Power Density and Reduce Size of Thermal Batteries	$500,385
151360	Multi-Phase Laminates: A Study of Prompt Transformations in Abnormal Environments	$467,607
151361	Liquid Metal Environment Sensing Devices (ESDs)	$401,156
151362	Low Energy Electron-Photon Transport	$346,620
151363	Modeling Electron Transport in the Presence of Electric and Magnetic Fields	$389,469
151364	Mesoscale Modeling of Dynamic Loading of Heterogeneous Materials	$259,127
151365	Dynamic Temperature Measurements with Embedded Optical Sensors	$307,810
151366	Spectral Line-Broadening in White Dwarf Photospheres	$342,422
151367	Z-Petawatt Driven Ion Beam Radiography Development	$332,693
151368	Descriptions and Comparisons of Brain Microvasculature via Random Graph Models	$52,250
151369	Development of Novel Nanoarchitectures to Enhance High-Temperature Thermoelectric Oxides for Clean Energy Harvesting	$29,998
151370	Reconstruction of a High-Resolution Late Holocene Arctic Paleoclimate Record from Colville River Delta Sediments	$23,940

151371	Experimental Bed Load Transport in Meandering Channels	$16,047
151372	Coupled Electrical, Electrochemical, and Thermal Performance of Large Format Lithium-Ion Batteries with Internal Cooling	$52,250
151373	Discriminative Feature-Rich Models for Syntax-Based Machine Translation	$53,006
151374	Relational Decision Making	$53,243
151375	CVD Encapsulation of Mammalian Cells for Hazardous Agent Detection	$29,930
151376	Autotuning for Scalable Linear Algebra	$29,374
151377	Fundamental Investigation of CVD Graphene Synthesis	$29,441
151378	Probing Surface Phenomena in Elevated-Temperature Energy Materials Under Realistic Conditions	$264,698
151379	Virus-Like Particles Displaying Random Peptide Libraries for Use in Rapid Response to Pathogens	$255,105
151381	High-Density Nanopore Array for Selective Biomoleculer Transport	$47,891
151382	Thermal Transport Properties of Nanostructured Materials for Energy Conversion	$60,216
151383	On Strongly Coupled Partitioned Schemes for Solving Fluid-Structure Interaction Problems Using High Order Finite Element Models Based on Minimization Principles	$23,554
151384	Nanostructured Metal Oxide Photoelectrodes for Solar Hydrogen Production	$57,027
151411	Optimizing Infrastructure Investments in a Competitive Environment	$244,497
152501	AQUARIUS: Adiabatic Quantum Architectures in Ultracold Systems	$6,408,334
152502	Novel Failure Analysis Technique for Defect or Precursor Detection	$225,169
152503	Enabling Secure, Scalable Microgrids with High Penetration Renewables	$3,272,487
152504	Epsilon Near Zero Material for Electromagnetic Energy Transport Through Sub-wavelength Channels	$247,387
152505	High-Mobility 2D Hole Systems for Quantum Computing Applications	$146,532
152506	Imaging and Quantification of Hydrogen Isotope Trapping in Stainless Steels	$244,974
152507	Modeling Reactive Transport in Deformable Porous Media Using the Theory of Interacting Continua	$136,129
153236	Formation of Algae Growth and Lipid Production Constitutive Relations for Improved Algae Modeling	$238,574

153237	Enhanced Target Imaging and Reconnaissance in Multipath-Rich Environments	$246,228
153342	Automated Exploration of the Mechanism of Elementary Reactions	$247,596
153346	Nanofabrication of Tunable Nanowire Lasers via Electron and Ion-Beam Based Techniques	$248,136
153887	Analysis of Gas-Lubricated Foil Thrust Bearings in Supercritical CO2 Flow	$245,086
153888	Beam Adaptable Sonar System (BASS)	$94,709
153889	Compact Reactor for Biofuel Synthesis	$228,863
153890	Multi-Physics Modeling of Environmentally-Activated Network Polymers	$232,394
153891	Robust Classifiers for Dataset Shift Induced by Unmodeled Effects	$195,838
153892	Time-Resolved Chemical Mapping of Phase Transformations in Li-ion Battery Electrodes	$245,868
154002	Combinatorial Optimization with Demands	$232,804
154058	Developing a Multiscale Test Approach for Characterizing NW Polymer Composites	$204,734
154059	Improved Performance and Robustness of Scalable Quantum Computing	$248,917
154060	New Strategies for Pulsed Power Transmission Lines: From Repetitive to Replaceable to Recyclable	$601,844
154081	On-Chip Low Power Frequency Comb with Spectral Selectivity	$241,824
154195	On-Chip Coherent Qubit Operations with Microfabricated Surface Ion Traps	$96,966
154197	Hybrid Methods for Cybersecurity Analysis	$701,649
154198	Investigate the Effectiveness of Many-core Network Processors for High Performance Cyber Protection Systems	$381,445
154199	Leveraging Complexity for Unpredictable yet Robust Cyber Systems	$448,699
154200	Massive-scale Graph Analysis on Advanced Many-core Architectures	$415,564
154259	Thin Magnetic Conductor Substrate for Placement-Immune, Electrically Small Antennas	$223,902
154273	Beam-Enhanced Electrical Fingerprinting of Complex Integrated Circuits	$296,425
154274	Proactive Defense for Evolving Cyber Threats	$372,698
154275	Partial Memory Image Analysis	$342,963
154317	A Geometrically Explicit Approach to Adaptive Remeshing for Robust Fracture Evolution Modeling	$175,446

154319	Development of a Raman Spectroscopy Technique to Detect Alternate Transportation Fuel Hydrocarbon Intermediates in Complex Combustion Environments	$219,700
154320	Simplifying Virtual Machine Security Through Foundational Introspection Capabilities	$245,374
154352	Analytic Methodology for Assessing Supply Chains	$443,305
154531	Community-Based Resistance to Intrusion in Information Technology Systems	$512,158
154532	Detection of Identifiable Data	$181,894
154568	Clustered Void Growth in Ductile Metals	$153,286
154570	Simulation-Based Strategic Analysis of Complex Security Scenarios	$216,676
154587	Sandia Trusted Model of Computation	$288,221
154691	Exploring Formal Verification Methodology for FPGA-based Digital Systems	$250,682
154693	Reliable PUFs for Supply Chain Assurance	$494,251
154694	Multi-objective Optimization Approach for Multimodal Information Retrieval	$201,096
154762	A Novel Bi-functional Conducting Polymer Sensor Material	$253,976
154763	Coaxial Microwave Neutron Interrogation Source	$166,441
154764	High Resolution (Sub 50nm) 3D, In situ Nano-Fabrication of Conductive Elements Within Insulators Using Point Spread Function (PSF) Engineered Lithography or Thermal Heating	$119,177
154778	Advanced Encryption Applications	$308,763
154813	Ultrafast Laser Diagnostics to Investigate Initiation Fundamentals in Energetic Materials	$135,682
154815	Uncertainty Quantification and Substantiation for Machine Learning in the Context of Cyber-Security	$187,891
154936	Development of Large Area Geiger-mode Avalanche Photodiodes	$180,084
155064	Chromophore-Functionalized Aligned Carbon Nanotube Arrays	$50,229
155065	Polymer-MOF Nanocomposites for High Performance Dielectric Materials	$183,164
155092	Application-Specific Micro-Ion Trap Development for Mass Spectrometry of Atmospheric Molecules Important to Climate Change	$124,851
155298	Time-Resolved Broadband Cavity-Enhanced Absorption Spectrometry for Chemical Kinetics	$176,212
155299	Time Encoded Radiation Imaging	$50,494

155300	Behavioral Modeling of Network and Physical Transactions for the Detection of Insider Activity	$169,607
155326	Realization of Practical Ultrashort Pulse Laser Technology Through Sandia's All-Fiber Saturable Absorber	$98,203
155327	Interface-Tracking Hydrodynamic Model for Droplet Electro-coalescence	$121,001
155367	Three Wafer Stacking for 3D Integration	$54,079
155403	Thermal Spray Integration of Electronic Components	$49,332
155407	Low Loss Fiber-waveguide Coupling for Silicon Photonics Integrated Circuits	$52,653
155408	Leveraging Safety Applications for Global Revocation and Congestion Control in Vehicular ad hoc Networks	$127,200
155409	Ion-Induced Secondary Electron Emission and Surface Flashover Breakdown for High Gradient Ion Beam Accelerators	$146,620
155410	Exploring the Origin and Applications of Extraordinary Electromagnetic Transmission	$43,992
155411	Exploring Energy Transfer Processes in Semiconductor Light Emitters	$49,878
155412	Confined Cooperative Self-Assembly and Synthesis of Optically and Electrically Active Nanostructures	$68,107
155458	Integration of MHD Load Models With Detailed Circuit Representations of Pulsed Power Drivers	$84,494
155550	Accelerating the Development of Transparent Graphene Electrodes through Basic Science Driven Chemical Functionalization	$157,627
155551	Automated Generation of Spatially Varying Stochastic Expansions for Embedded Uncertainty Quantification	$75,981
155552	Characterization and Synthesis of Energy Storage Materials	$60,866
155553	Electrokinetic Measurements of Surfaces	$54,807
155554	Hybrid Optics for Broadband Optical Systems	$148,010
155650	Quantifying Significance of Spatial-Temporal Climatic Indicators	$47,596
155797	Solar Fuel Cell for Wastewater Treatment with Simultaneous H2 Production	$141,418
155798	Softening Behavior of Post-Damage Quasi-Brittle Porous Materials	$123,621
155799	Identifying Dynamic Patterns in Network Traffic to Predict and Mitigate Cyberattacks	$123,660
155802	Alternative Waveforms for New Capabilities in Radar Systems	$143,748

155804	Aerosol Characterization Study Using Multi-Spectrum Remote Sensing Measurement Techniques	$145,558
156135	Use of Limited Data to Construct Bayesian Networks for Probabilistic Risk Assessment	$116,632
156137	Improving Shallow Tunnel Detection from Surface Seismic Methods	$140,288
156138	Dynamics of Point Source Signal Detection on Infrared Focal Plane Arrays	$135,748
156158	New Methods Of Uncertainty Quantification for Mixed Discrete-Continuous Variable Models	$135,119
156250	Assessing Vulnerabilities of Reconfigurable Logic RF Systems	$173,620
156251	Developing Highly Scalable Fluid Solvers for Enabling Multiphysics Simulation	$85,934
156252	Flyer-Plate-Driven Hydrodynamic Instabilities Using Z	$88,606
156400	Characterization of Atmospheric Ionization Techniques for the Identification of New Chemical Signatures from Home-made Explosives in Complex Matrices	$103,801
156434	Multivalent Interactions with Charged Lipids	$56,474
156435	Peering Through the Haze: Privacy and Monitoring in the Cloud Computing Paradigm	$97,805
156436	Secure and Efficient Privacy Preserving Program Obfuscation with Oblivious RAM	$127,521
156702	Smart Adaptive Wind Turbines and Smart Adaptive Wind Farms	$76,951
156703	Simulation of Primary Fuel Atomization Processes at Subcritical Pressures	$110,204
156704	Determination of Reaction Zone Length in Vapor-deposited Explosive Films	$126,006
157145	Fluid Flow Measurement of High Temperature Molten Nitrate Salts	$84,706
157168	Advanced Malware Analytics	$78,857
157310	Optical Refrigeration in Semiconductors for Next Generation Cryocooling	$96,417
157311	Hydrological Characterization of Karst Phenomenon in a Semi-Arid Region using In-situ Geophysical Technologies	$86,117
157633	Silicon Photonics for Ultra-Linear RF Photonic Devices and Links	$89,437
157688	Multilevel Summation Methods for Efficient Evaluation of Long-Range Pairwise Interactions in Atomistic and Coarse-Grained Molecular Simulation	$66,333

157690	Luminescent Lanthanide Reporters for High-Sensitivity Novel Bioassays	$85,946
157693	Kinetics of Radiation-Driven Phase Transformations in PZT Ceramics	$80,160
157694	Beyond the Ideal Nanostructure: Local Environmental Effects on the Electronic and Optical Properties of Carbon Nanotubes	$90,403
157910	Authorship Attribution for Natural Language Text and Software	$85,644
157957	Predicting the Future Trajectory of Arctic Sea Ice: Reducing Uncertainty in High-Resolution Sea Ice Models	$75,333
158181	Micro-scale Heat Exchangers for Cryogenic Micro-cooling Applications	$25,068
158182	High Performance Graphics Processor based Computed Tomography Reconstruction Algorithms for Nuclear and Other Large Scale Applications	$68,013
158183	Gas Permeation Properties of Graphene Membranes	$74,158
158184	New Thin Film Materials for Electronics	$62,502
158185	Pathogenicity Island Mobility and Gene Content	$50,774
158186	Production of Extremophilic Bacterial Cellulase Enzymes in Aspergillus Niger	$62,212
158410	Intra-membrane Molecular Interactions of K+ Channel Proteins: Application to Problems in Biodefense and Bioenergy	$47,637
158477	Sublinear Algorithms for Massive Data Sets	$65,035
158478	Functional and Robust Asymmetric Polymer Vesicles	$65,394
158481	Cubic Organic Scintillators as Improved Materials for Fast Neutron Detection	$61,925
158482	Accurate Model Development for Large Eddy Simulation of Turbulent Compressible Flow Problems	$45,723
158518	Integrated Auto-catalytic Composite Strategies	$66,231
158698	A High Voltage, High Current Thyristor Stack Command Triggered by dV/dt - An Improved MOS-Controlled Thyristor-like Nanosecond Closing Switch	$35,621
158700	Explosives Detection with Neutrons from a Short Pulse High Intensity Neutron Source	$49,562
158701	Laser-Ablated Active Doping Technique for Visible Spectroscopy Measurements on Z	$30,134
158702	Surface Electrochemistry of Perovskite Fuel-cell Cathodes Understood In-Operando	$62,849
158997	Heterogeneous Scalable Framework for Multiphase Flows	$30,366

158998	Nuclear Fuel Cycle System Simulation Tool Based on High-Fidelity Component Modeling	$33,663
158999	Development of a System Model for a Small Modular Reactor Operating with a S-CO2 Cycle on a DoD Installation that Utilizes a Smart/Micro-Grid	$35,256
159005	Interaction-driven Learning Approaches to Complex Systems Modeling	$28,566
159006	Transactions for Resilience and Consistency in Integrated Application Workflows for High Performance Computing	$36,679
	Total Cost for SNL: $160,575,872	
	Total # of Projects for SNL: 427	
	Total Administrative Cost $2,465,389	
SRNL - Savannah River National Lab		
LDRD-FP-2010-007	Evaluation of the long-term effectiveness of enhanced soil remediation with mixed amendments using geochemical parameters and numerical modeling under field conditions	$53
LDRD-FP-2010-009	Structure Property Relations in Mixed Ionic/Electronic Conductive Ceramics for Energy Conversion	$2,896
LDRD-FP-2010-016	Proton Conductive Solid Polymer Electrolyte for Mg-Ni Rechargeable Batteries	$1,885
LDRD-FP-2010-034	Self Assembly of Shape Selective Catalyst Impregnated Membranes: Toward Direct Methanol Fuel Cells (DMFC)	$4,272
LDRD-FP-2010-037	Biodiesel Production From Algae Grown in South Carolina	$468
LDRD-FP-2010-042	Thermodynamic evaluation of metallic waste forms for nuclear materials.	$2,861
LDRD-FP-2010-055	Advanced Gas Sensors Using SERS-Activated Waveguides	$465
LDRD-QH-2010-006	Nano-Composite Hybrid Lithium-Ion Battery	$4,927
LDRD-QH-2010-009	Novel Neutron Detector Based on HDR	$44,378
LDRD-QH-2010-035	Sorption of CO2 into Supported Ionogels for Advanced Carbon Sequestration Technologies	$251
LDRD-SI-2011-001	Reactive Gas Reprocessing of Spent Nuclear Fuel	$493,487
LDRD-SI-2011-003	Risk Reduction and Process Optimization for Engineered Algae Production Systems	$464,358
LDRD-SI-2011-004	Nano-Photocatalysts for Solar Fuels Applications: Conversion of CO2 to Hydrocarbons	$462,954
LDRD-SI-FY09/10-005	Nanosize Titanates for Optimized Performance in Separations Science, Innovative Medical Applications and Photochemistry	$436,511

LDRD-SI-FY09/10-015	Development of High Capacity Portable Power Systems	$346,020
LDRD-SI-FY09/10-023	Advanced Batteries for Electric Energy Storage	$249,517
LDRD-SI-FY09/10-033	The Use of Statistical Downscaling to Project Regional Climate Changes as They Relate to Future Energy Production	$362,522
LDRD-ST-2011-002	Effects of Hemicellulose Removal on Delignification and Hydrolysis of Lignocellulosic Materials	$192,297
LDRD-ST-2011-003	Can Ionic Liquids be Used as Templating Agents for Controlled Design of U-containing Nanomaterials	$181,176
LDRD-ST-2011-006	Improved Characterization of Air Emission Sources Using Evolutionary Ensembles	$188,737
LDRD-ST-2011-008	Stable Electrocatalysts for High Temperature Fuel Cells	$225,951
LDRD-ST-2011-010	Detoxification of Uranium in Soils and Groundwater Using Recycled Concrete	$189,993
LDRD-ST-2011-011	Investigation of the Mechanisms Governing Charge Transport & Storage in Organic Semiconducting Materials Toward New Devices	$168,900
LDRD-ST-2011-014	Advanced Gas Sensors Using SERS-Activated Waveguides	$203,758
LDRD-ST-2011-015	Carbon Nanomaterials with Encapsulated Gadolinium for Advanced Neutron Detection	$174,086
LDRD-ST-2011-017	Development of Cooling Towers for Enhanced Biocollection, Concentration, and Biodetections	$210,825
LDRD-ST-2011-019	Establishing the Potential of the TERAS System for CO2 Capture and Sequestration	$206,834
LDRD-ST-2011-020	Organic-based Ionic Salts for Optimization of Alkaline Fuel Cells	$209,563
LDRD-ST-2011-021	Ionogels as Solid Electrolytes for Advanced Battery Application	$210,876
LDRD-ST-2011-022	Heterogeneous Materials and Novel Interfaces for Oxygen Separation Membranes	$171,895
LDRD-ST-2011-024	High Performance Nanofluidic Sensors for Detecting Chemical and Biological Agents in Deterrence of Terrorist Attacks	$214,861
	Total Cost for SRNL: $5,623,353	
	Total # of Projects for SRNL: 31	
	Total Administrative Cost $172,155	
SRP - Savannah River Plant		
SR07005	Stainless Steel Surface Treatments for Mass Spectroscopy Systems	$5,511
SR07011	Hydrogen Isotope Recovery Using a Proton Exchange Membrane (PEM) Electrolyzer	$10,671

SR08001	Betavoltaics for Tritium Detection	$9,186
SR08006	Accelerated Testing Methodology for Tritium Compatibility of Stainless Steel	$208,868
SR09001	Reusable nano-iron beds for tritium recovery-an alternative to magnesium beds	$157,994
SR09020	Low-voltage tritium detection based on gas nano-proportional counters	$232,759
SR09026	Performance of testing of mechanically alloyed zirconium-iron getter materials	$14,033
SR09034	Evaluate Pt-based catalysts for tritium oxidation reaction	$216,202
SR09041	Cavity enhanced absorbance gas cells for use in trace gas optical detection	$96,218
SR11001	Mini-TCAP (Thermal Cycling Absorption Process)	$1,038,553
SR11002	Hydride Bed Thermally Enhanced Cartridge Heated Modification (TECH-Mod)	$889,605
SR11003	Thermal Energy Application to Reliably and Safely Self-Power Systems and Processes	$102,752
	Total Cost for SRP: $2,982,352	
	Total # of Projects for SRP: 12	
	Total Administrative Cost $100,688	
Y-12 - Y-12 Plant		
PD100108	Microwire Embedded Sensor	339,291
PD100229	Explosive Failure & Mitigation	359,364
PD100232	Oxygen Analysis of Salt	19,741
PD100234	Crimp Weld Process Improvement	98,218
PD100242	Dimensional Metrology Develop	115,791
PD100262	Moisture Monitor Evaluation	105,943
PD100264	Ultra-Wide Band Study	169,088
PD100268	Develop NDE Raman Capabilities	712,844
PD100274	Electroplating of U-Mo Foils	105,655
PD100277	Determine Thermodynamic Prop	199,515
PD100280	Dual-YZ Controller Replacement	294,354

PD100281	Real-Time Analysis Of U Welding	45,560
PD100289	Nuclear Detection/Sensor Testing	751,480
PD100290	Advanced Digital Radiography	531,296
PD100294	Process Measurements	495,564
PD100298	Deform/Microstructure of As-Cast DU	288,856
PD100303	CMM Research Equipment	375,881
PD100307	NDE Assay U Oxides In Columns	312,458
PD100312	Heavy Water Production	267,754
PD100313	U Separation Technologies	387,002
PD100315	Mixing Tank Evaluation	513,606
PD100323	Adv Disassembly for Recov/Reuse	389,917
PD100324	Precision Hydroforming	206,993
PD100326	Personnel Account. Infrastructure	285,240
PD100327	Adv Technology Solutions Devel	79,579
PD100335	Tin Whisker Mitigation	179,015
PD100340	Immobilization Methods	98,333
PD100482	UNH Calcination Optimization	211,493
PD100503	REX System Operating Parameters	399
PD110221	AIMS Prototype	647,223
PD110516	DER/ER of Uranium	1,880,421
PD110661	Reduced Exposure Manufacturing	859,946
PD110665	Nest Detect. for UPF Machining	14,705
PD110668	Efficient Tooling Fabrication	70,967
PD110669	Wireless Sensor Network for Prod.	252,379

PD110670	Measure and Stds for NDSTC	236,943
PD110674	Eval. Interaction LiH/Pump Oil	135,912
PD110675	Recover Precious Metal/Plating	208,067
PD110684	Spark Source TOF Mass Spec	383,179
PD110707	Quant C Reduction by Flotation	42,957
PD110714	Tool Height Sensor for Turning	203,258
PD110716	High-Energy CT Acquisition	211,697
PD110718	Diskless-Wireless Prod Prototype	502,602
PD110720	Compatibility - Nuclear Fuels	369,710
PD110737	Impr. Chip Management System	227,554
PD110738	Alloy Processing in MW Casting	383,241
PD110755	Small Scale Li Wet Chemistry	252,759
PD110776	Eval Dim Metrology Technology	45,740
PD110777	Small Defect Metrology Artifact	110,711
PD110794	Standoff Detection Feasibility	239,241
PD110804	Surface Repair of Casting Defect	22,986
PD110812	Dynamic Testing Capability	297,963
PD110813	Secure Wireless VOIP in Production	54,053
PD110834	Thermal Decomposition Testing	434,176
PD110839	Methods for Making U-Mo Powder	823,642
PD110843	Special Material Flowsheet	138,930
PD110856	Ion Polish on U-Metallography	92,279
PD110858	Improved High Temp MW Crucibles	300,891
PD110864	Janus Spindle Evaluation	694,101

PD110881	UO2 Fuel Processing Parameters	193,896
PD110882	Using Mylar Bags for U Parts	82,567
PD110907	FI&S Maintenance Management	66,671
PD110909	Video-Based Dectection for UPF	140,765
PD110930	Personnel Contamination Monitor	49,753
PD110936	Software for Scientific Instrum.	90,903
PD110953	Special Casting and NCS	781,323
PD110974	Alt. U Compound Synthesis	207,589
PD111021	Reuse/Reaccept Criteria	70,423
PD111210	Technical Fellowship	258,585
Y1209002	Solid-state NMR Techniques	414,084
Y1209005	Polymer Barrier Properties	341,598
Y1209006	Neutron Diffraction Studies of U	176,106
Y1209007	Boron Phosphide Neutron Detector	346,115
Y1209015	Physical Properties of U - CSM	277,535
Y1209026	Lithium Manufacturing Methods	962,061
Y1209031	Pilot Access Authorization System	173,543
Y1209032	NDE Flaw Detection in Castings	33,300
Y1209076	Pre/Post Cast U Grain Refining	264,479
Y1209090	Develop Press Forming Process	40,146
Y1209130	Special Material Capability	492,842
Y1209132	Uranium Mass Flow Meters	1,205,578
Y1209134	Chip and Part Cleaning	490,546
Y1209147	Wireless Sprinkler Monitoring	151,953
	Total Cost for Y-12: $25,390,824	

	Total # of Projects for Y-12: 83
	Total Administrative Cost $1,614,205